

PROSPECT, LEGAL, AND HEALTH RISKS IN ADOPTING THE METAVERSE IN MEDICAL PRACTICE: A CASE STUDY OF NIGERIA

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Abstract

The Metaverse provides a prospective opportunity for medical practitioners to improve patient engagement, training of medical personnel, and simulation-based learning. It allows for immersive telemedicine medical practice, enabling medical practitioners to render medical services to patients in remote areas through realistic virtual consultation and training of medical personnel and students through a lifelike simulation. However, despite the potential of the Metaverse concept in medical practice, certain legal and medical issues could mitigate its usefulness. In this regard, this study adopts a hybrid method of research in ascertaining the prospect, legal, and health risks of utilizing the metaverse in medical practice. 256 questionnaires were distributed, and the result obtained was analysed using descriptive and

analytical methods. The study found that there are several potentials for utilizing the metaverse in medical practice. However, there are legal and medical risks in utilizing the metaverse in medical practice and they include; patient data privacy, regulation, licensing, patient consenting to virtual medical treatment, and accountability for medical errors in the metaverse. Furthermore, the study also found that spending longer hours in the metaverse could result in sedentary behavior, associated with medical issues like obesity, musculoskeletal disorders, and cardiovascular problems. It was therefore concluded and recommended that the metaverse holds significant promise for the future of medical practice in Nigeria, offering innovative solutions that can transform healthcare delivery and education. However, to avoid legal and medical issues that may occur, there is a need for regulatory compliance with healthcare regulations.

Keywords: Legal, Health, Metaverse, Medical, Nigeria

Introduction

Globally, medical practice is regarded as an essential and influential part of healthcare systems. An equipped and effective healthcare system often determines the wellness and health safety of the general public¹ of every given society. However, the practice of medicine and its control are confronted with a web of complex challenges that transcend the shore of Nigeria to the global community². Globally, the challenges of medical practice go beyond the borders of a state³ which necessitate the advocacy and concerns for the unification of medical standards to

¹ Aidonojie Paul Atagamen, Idahosa Milicent Ekata, Agbale O. Patience, and Oyedeji Adefisayo, (2022), "The Environmental Conservation, and Ethical Issues concerning Herbal Products in Nigeria", *Journal of Environmental Science and Economics*, 1(3), 26-32 <https://doi.org/10.56556/jescae.v1i3.124>

² Aidonojie Paul Atagamen, Oaihimire E. Idemudia and Agbale O. Patient, (2022), "The Legal and Ethical Issues concerning Diagnosing and Treatment of Patients by Pharmacists in Nigeria", *Euromentor Journal*, 13(2), 113-138

³ Aidonojie Paul Atagamen, Aidonojie Esther Chetachukwu, Edetalehn O. Idemudia, Ikubanni O. Oluwaseye, and Oyebade A. Adeniyi, (2022), "A Facile Study concerning the Legal Issues and Challenges of Herbal Medicine in Nigeria", *The Indonesian Journal of International Clinical Legal Education*, 4(4), <https://doi.org/10.15294/ijicle.v4i4.61641>

enhance a coherent cross-border healthcare provision⁴. Furthermore, the exponential growth of technology and equal allocation of healthcare supplies raises some ethical issues that require attention⁵. These issues are inherent in Nigeria ranging from deficiencies in the country's healthcare facilities to uneven opportunities for medical care, the inadequacy of legislative mechanisms, and complex ethical dilemmas emanating from cultural and traditional practices⁶. Thus, these challenges may be innovatively resolved by adopting metaverse, a digital opportunity to create a new approach to medical control and practice.

The arrival of metaverse a digital, networked, comprehensive, and vivid digital universe, capable of drastically altering global economies and structures across the world.⁷ Among the sectors poised for transformation, healthcare emerges as a significant frontier where the metaverse's potential holds immense promise. Therefore, it is reasonable to suggest that the metaverse is a virtual environment that blends the boundaries between the actual world and the digital world, providing a wealth of chances to transform the way healthcare is provided.⁸ In this digital environment, patients and physicians can take part in lifelike medical simulations, have interactive technologically driven consultations, and access cutting-edge methods for organising medical records. Additionally, it can help close the gap in healthcare access caused by geographic location, especially in Nigeria where impoverished and isolated areas frequently struggle to get access to quality medical care.⁹ But when healthcare ventures into this unexplored

⁴ Ibid

⁵ Aidonogie Paul Atagamen, Okuonghae Nosa and Ukhurebor E. Kingsley, (2022), "The Legal Rights and Challenges of COVID-19 Patients Accessing Private Healthcare in Nigeria", *BESTUUR*, 10(2), 183-197, <https://doi.org/10.20961/bestuur.v10i2.68118>

⁶ Ibid

⁷ Cheong Ben Chester (2022). Avatars in the metaverse: potential legal issues and remedies. *International Cybersecurity Law Review*, 3(2).

⁸ Dwivedi Yogesh et al., (2022). Metaverse beyond the hype: Multidisciplinary perspectives on emerging challenges, opportunities, and agenda for research, practice and policy. *International Journal of Information Management*, 66, 102542.

⁹ Ibid

area, it faces a plethora of ethical and legal issues that require serious thought.

However, it suffices to state that implementing the metaverse concept in medical practice, in reality, is fraught with challenges that temper these expectations and promises. This concerns the fact that Nigeria's healthcare sector faces several limitations, including inconsistent internet access, inadequate infrastructure, and a high level of digital illiteracy, particularly in rural regions. These obstacles complicate the adoption of metaverse as a major solution and breakthrough in medical practice. In this regard, these shortcomings therefore create a gap between what is theoretically possible or achievable and what is practically possible and achievable. Many legal complications arise when the metaverse is incorporated into medical practice. Nigeria, like many other countries, must deal with the difficulty of modifying current laws to take into account this new digital frontier.¹⁰ These important legal issues include creating a strong regulatory framework for virtual healthcare, protecting the confidentiality and safety of patients in an increasingly digital healthcare environment, establishing guidelines for accreditation and licensing for healthcare professionals working in the metaverse, and handling negligence and liability concerns.¹¹ In addition, health hazards and moral conundrums surface, such as worries about how the digital divide exacerbates healthcare inequalities, the spread of inaccurate data about health in virtual settings, the possible negative effects of prolonged engagement in the metaverse on mental health, and the moral conundrums involving virtual physician-patient interactions and cultural sensitivities.¹² Thus, while the prospects are promising and seem to be encouraging, the reality in Nigeria accentuates a clash between the transformative potential of the metaverse concept and the practicality, legal, and other socio-economic barriers that must be addressed for successful integration.

Against the above backdrop, this paper seeks to provide a thorough analysis of the possible transformation of medical practice in Nigeria

¹⁰ Fedorchenko Sergey, (2020). Artificial intelligence phenomenon: citizen between digital avatar and political interface. *Journal of Political Research*, 4(2), 34–57.

¹¹ Mochalov Artur, (2021). Digital Profile: Main Risks for Constitutional Human Rights in the face of Legal Uncertainty. *Lex Russica*, 74(9), 88–101.

¹² Ibid

using the prism of the metaverse, navigating the complex road involving these prospects, legal issues, and health dangers.

Methodology

The researcher in this study employs a mixed research methodology, which combines both doctrinal and non-doctrinal approaches to examine the potential, legal implications, and health risks associated with the use of the Metaverse in medical practice. The doctrinal aspect of the study focuses on theoretical considerations related to the Metaverse, as well as legal and medical issues that may arise when integrating the Metaverse into medical practice. This was achieved by reviewing a variety of scholarly literature sources, including online journal articles, academic journals, and textbooks. These sources were consulted to gain insights into the development of the Metaverse, medical practices, and healthcare issues in Nigeria.

Furthermore, the non-doctrinal aspect of the research aims to gather practical insights from healthcare professionals in Nigeria regarding the opportunities, legal concerns, and health risks associated with the incorporation of the Metaverse into medical practice. This was accomplished through the distribution of questionnaires to medical practitioners in Nigeria. The primary objective of this phase is to gain firsthand perspectives and recommendations from these practitioners regarding potential health and legal challenges in the utilization of the Metaverse in healthcare. The data collected from the questionnaires were subjected to mathematical, numerical, and statistical analyses to provide a descriptive overview of the findings. Furthermore, the non-doctrinal approach also seeks to propose potential solutions and recommendations for addressing any identified health risks and legal issues that may arise from the utilization of the Metaverse in medical practice within the Nigerian context.

Legal Issues and Ethical Healthcare challenges in Nigeria

Over the decades, with the increasing population, Nigeria has consistently been confronted with several healthcare-related issues that

keep increasing by the day.¹³ These issues are multifaceted and include problems with infrastructure, affordability, accessibility, and quality. The Nigerian healthcare system urgently needs to integrate digital technologies to successfully handle these complicated issues.¹⁴ Thus, the following are some of these health-related issues that are frequently faced by Nigerians:

- i. **Limited Access to Healthcare Services:** Inadequate availability of healthcare services, especially in underdeveloped and remote regions, is one of Nigeria's most urgent healthcare concerns.¹⁵ Due to the large geographic size of the nation and the dearth of medical professionals and facilities, millions of Nigerians lack proper access to healthcare.¹⁶ However, the adoption of telemedicine and virtual medical consultations through digital technology can help to address this issue and also assist physicians in contacting their patients in remote parts of the country.¹⁷
- ii. **Inadequate Healthcare Infrastructure:** The inadequacy and antiquated nature of medical equipment remains a serious challenge in Nigeria. It is no gainsaying that even in this 21st century, several hospitals and other healthcare facilities suffer from not only the shortage of required medical equipment but there is no steady power supply with which most of this equipment can function.¹⁸ However, to enhance the improvement of healthcare services in Nigeria, there is a need to encourage virtual diagnoses and a reduction of the need for physical facilities facilitating remote diagnoses through the

¹³ Frederick Mostert and Wei Ting Yeoh, (2022). Meta-Worse, a lawyer's mega paradise. *Journal of Intellectual Property Law & Practice*, 17(3), 211–212.

¹⁴ Zaslavskii Darl, (2021). Avatar as a means of self-presentation of a personality in the virtual environment. *Innovatsii. Nauka. Obrazovanie*, 48, 1909–1914.

¹⁵ Ibid

¹⁶ Ibid

¹⁷ Minbaleev Avare, (2022). Problems of the civil law protection of personal non-property rights in the process of the digital profiling of citizens. *Grazhdanskoe Pravo*, 2, 9–11

¹⁸ Levan Nanobashvili (2022). If the Metaverse is Built, Will Copyright Challenges Come? *UIC Review of Intellectual Property Law*, 21(3), 215–251.

adoption of modern technologies such as telehealth systems and digital medical records (EHRs).

- iii. **Quality of Care and Medical Education:** In Nigeria, there is a problem with adherence to quality care and medical education. Health experts should continue to learn to be updated on improved medical facilities and knowledge expansion¹⁹. With the aid of modern technology, medical professionals, and students can conveniently improve their skills and acquire global knowledge and best practices in Nigeria through the opportunities of electronic learning platforms and digital simulations, without necessarily traveling outside the shores of the country.
- iv. **Fragmented Healthcare System:** The lack of coordination and harmonization of acceptable standards of practice is a serious challenge in Nigeria's healthcare system. Over time, this has occasioned inefficiencies that have impacted negatively on the treatment of patients. In the worst situations, death. The adoption of modern technology can guarantee the easy flow of communication and data transfer among healthcare providers which will encourage more coordinated and patient-centric care.
- v. **Data Management and Patient Records:** In several healthcare facilities in Nigeria. Medical records are still documented in papers therefore making it difficult to manage patients' data and occasioning errors in the process of data management²⁰. To this end, the implementation of an electronic recording system that improves the accuracy of patient data as well as accessibility which in turn leads to better healthcare service delivery and patient satisfaction.
- vi. **Health Information Disparities:** This is one of the major challenges of healthcare service delivery in Nigeria. While the dwellers in the urban regions of the country have access to quality healthcare services due to their access to useful health information, the dwellers in the rural areas have no such advantage²¹. It is instructive to state that the adoption of modern

¹⁹ Ibid

²⁰ Ibid

²¹ Nedzvetskaya Nesar & Prostavkov Idar, (2022). Virtual reality of a digital society. *Philosophy of Economy*, 3(141), 208–217.

technologies can help resolve this challenge. With technology, people can access useful information about their health. It also helps to promote health education that will help people to make quality decisions about their overall well-being.

Overall, the introduction of modern technologies in the healthcare system will adequately tackle most of the challenges facing the healthcare systems in Nigeria. Be that as it may, reshaping the healthcare system requires serious planning, education on technological know-how, enactment of specific legislation for its regulation, and infrastructural developments. The improvement of the healthcare system in Nigeria is largely dependent on the degree to which the country can embrace and apply in full force the modern technologies in its healthcare system.

Overview of the Metaverse and its development

Technology enthusiasts and futurists²² are fascinated by the Metaverse, a virtual reality (VR) space that allows users to engage in a shared environment that transcends individual virtual worlds. The idea of the Metaverse originated in science fiction, specifically in Neal Stephenson's 1992 book "Snow Crash. This is to say, that the concept under discourse, "metaverse" was brought to full limelight by this American literature writer of great distinction, Neal Stephenson in his aforementioned wide read cyberpunk novel. The understanding handed down to readers in that novel is that Metaverse is a great virtual platform that affords its users the privilege of communicating via avatars. For the records, even though the performance then was not so much of what we will appreciate today because of how far we have come technologically, the truth remains that the globe wide range of exploration the world has witnessed today is traceable to this innovative idea which has not only set the stage for the exploration we see today but has become its strong foundation upon which every other stone is laid²³. Meanwhile, Metaverse also had its beginning and evolvement

²² Nemitz Paul, (2018). Constitutional democracy and technology in the age of artificial intelligence. *Philosophical Transactions of the Royal Society A. Mathematical Physical and Engineering Sciences*, 376(2133).

²³ Ibid

stage which is historical with the early virtual worlds as well as the online multiplayer games as they were then known. Avatars were created and used on websites such as Second Life, which launched in 2003 and allowed users to create avatars, interact with others, and build virtual spaces²⁴. Though they fell short of the entire Metaverse concept, these virtual worlds constituted early attempts at building shared digital landscapes. Thanks to recent technical developments, the Metaverse is now a realistic reality²⁵ rather than just a science fiction concept. Key developments include:

Additionally, advancements in the fields of augmented reality and virtual reality (VR/AR) are changing how we interact with digital worlds. Today, internet users and audiences in an increasing degree enjoy and celebrate great virtual experiences every day because of the availability of virtual reality devices such as Oculus Rift and augmented reality technology known as Hololens²⁶. To say more, the emergence of these devices has brought so much improvement to different aspects of human endeavours because they avail the world so many great and needed opportunities that now made the creation of metaverse very easy and to say the less, this has resulted into transforming several industries across different borders and this include the educational sector, game and entertainment industries.

Furthermore, the introduction of blockchain technology, a system which made the idea of digital ownership in virtual spaces is very significant and same is credit to the emergence of this devices²⁷. It is exciting to talk about blockchain technology, because it has made ownership which is known as property right in the legal parlance possible. With this innovation, creation of digital assets with actual ownership of the same is possible and it should be noted that this practice had significant impacts on the Metaverse developing economy as well as the acknowledgement and protection of digital rights²⁸. The Blockchain within the virtual space therefore, is by its very innovative

²⁴ Ibid

²⁵ Ibid

²⁶ Ibid

²⁷ Ibid

²⁸ Ibid

approach fast changing and taking over the traditional way so speak of it now virtual assets are exchanged.

Artificial Intelligence(AI), is another exciting, significant, innovative and unique thing that has happened to the world and relative to our topic it had so much enhanced virtual experiences in not small way. Artificial Intelligence, has added colour to the thriving virtual environments that we have today particularly in the area of computer vision and the use of language²⁹. Earlier on a little was discussed about the significant roles being played by Virtual Reality (VR) and Augmented Reality (AR) in made virtual reality experiences an exciting one. But then, it is important to state at this juncture that the responsive as well as the thriving interaction that is obtainable in VR/AR environments made possible by the Artificial intelligence(AI) powered system. This is a system that aids in making the creation of much more needed interactive, thriving, dynamic, exciting and immersive digital world possible. To this extent, therefore, it is safe to conclude that the influence of Artificial Intelligence in the evolution of metaverse today cannot be overemphasised and it undeniably impacting and redefining the possibility that domicile in the digital world of interactions.

Concerning the above features of the metaverse, it is apt to state that, the Metaverse's development is driven by a wide range of potential use cases, including:

- i. Users can socialize, work, and collaborate in virtual environments.
- ii. Virtual concerts, events, and immersive gaming experiences are currently emerging in the Metaverse.
- iii. The Metaverse offers innovative platforms for education (which could also include medical training), training simulations, and skill development.
- iv. Virtual currencies and digital assets within the Metaverse have economic implications, including virtual real estate ownership and digital art sales.

²⁹ Ibid

Furthermore, big tech corporations have entered the Metaverse space after seeing its potential in light of its prospective. In 2021, Facebook (now Meta Platforms, Inc.) declared that it will rebrand with an emphasis on the Metaverse³⁰. Other businesses that are investing in Metaverse-related initiatives and technology include Google, Microsoft, and Epic Games. In this regard, it is historically factual, logical and safe to conclude that Metaverse has its root in the science fiction through to its enviable position today in the field of technology. Metaverse is used in diverse ways namely social interactions, economics engagements, entertainment involvements down to educational uses. While we commend this development as the world celebrate it, our lawmakers especially in Nigeria must prepare themselves well enough so as to manage the issues that come with this development to ensure that the essence which is to bring about a thriving virtual environment where several businesses can be transacted, is not defeated. If this is ensured, the Metaverse promises us a future where our interactions, work experience etc will be profound.

Adopting the Metaverse in enhancing medical regulation and Practice in Nigeria

In the fields of technology and digital interaction, the Metaverse is a virtual reality (VR), an idea that imagines a shared virtual environment for everyone is developing quickly. The healthcare industry is one of the many industries that stand to benefit from this digital frontier as it develops. This explains why the concept of metaverse, its evolution and its importance role to enhance medical practice is examine in relation to the peculiar circumstance of medical practice in Nigeria³¹. It is needless to say that, as already stated in the course of this discussion there are several advantages that Metaverse has which if well utilize will change and enhanced the healthcare practice in Nigeria³². Nigeria is known for

³⁰ Ibid

³¹ Pavel Stepanov and Maria Filatova, (2021). Problems of Protecting Virtual Game Property by Means of Criminal Law. *Russian Journal of Criminology*, 15(6), 744–755.

³² Oleksandr Zozulia, Ihor Zozulia, Oksana Brusakova, Yurii Kholod and Yevheniia Berezna, (2021). Information Sovereignty as the Basis of Modern State Information Security. *International Journal of Computer Science and Network Security*, 21(12), 264–268.

its diversity and it is referred to as the giant of Africa due to her population. This can have some effects on the medical practice but suffice to say that Metaverse has feature most fitted for this. It is in its ability to bridge the geophysical borders and extend medical services to every nook and cranny of a society which of course includes the remote and rural areas within the society. Concerning this, study has shown that due to its unique features that is far reaching Metaverse has been adjudged to be the best system a nation that has large population and very poor access to healthcare services due to the lack of facilities or the one or more reasons.

Furthermore, Nigeria needs to embrace Metaverse because it has made virtual consultancy and virtual medical services possible. The world is fast evolving that people would want to do everything from the comfort of their homes. For many years, there has not been much of this practice in the medical market. Everyone who wants to see a doctor goes to the hospital, sometime these places are very congested. This hold so many advantages, which includes but not limited to these that virtual medical services and consultancy will redeem the time and resources spent in the course of travelling to the hospital especially from far places.

In addendum, today Metaverse is seen as the innovative platform obtainable for medical training which to many academicians is an avenue to resolve the long-lasting issues of lack of medical professionalism in the country³³. Most excitedly, Metaverse made medical education practical, by this students' understanding is greatly enhanced. The immersive stimulation that is made available by Metaverse is deliberately designed in such a way that it resembles what is in the real world. Any medical student trained by this means will no

³³ Aidonojie Paul Atagamen, Adesoji K. Adebayo, Eregbuonye Obieshi, Antai G. Owoche, Ottah I. Ottah and Muhammad Mutawalli "The Prospect, Legal, and Socio-economic Implication of Metaverse Operation in Nigeria" (2024), Vol. 19(4), YURISDIKSI, 455, <https://doi.org/10.55173/yurisdiksi.v19i4.201>; Aidonojie Paul Atagamen, Eregbuonye Obieshi, Majekodunmi T. Afolabi, and Inagbor Micheal, (2024), "The Prospect and Legal Issues of Income Tax in the Nigerian Metaverse", *Trunojoyo Law Review (TLR)*, 6(1) 17-50, <https://doi.org/10.21107/tr.v6i1.23874>

doubt be competent as he is exposed to the things that prepare him for medical practice in real life thereby providing for quality medical services³⁴. Moreso, through Metaverse a patient in Nigeria can easily get access to a doctor overseas as well medical services outside Nigeria and the patient's chose nation. This is also one reason why Nigerians should be aware and embrace Metaverse as its saves them from a lot of stress and expenditure both of time and resources and afford them with the privilege to access medical services globally³⁵

Also, the importance of metaverse in the health sector is also found in the data gathering exercise³⁶. One common feature of medical practice is data gathering. There is no medical practice without data gathering and data analysis. The importance of this exercise necessitates that there should be strategic system to regulates data gathering and analysing. It is important to note that there is a provision for confidentiality in this arrangement such that patient's whose data are taking are sure of their privacy even though their data is being taking virtually. Each patient has access to their data's but cannot access another person's information and there is provision for the patient to monitor their information, their health as well as their doctors through this virtual platform even from the comfort of their homes. Through this method, diseases are easily spotted, complicated and chronic medical situations are easily managed and medical services are speedily rendered.

Moreso, Metaverse serves as a virtual setting for medical services for Nigerians which will help greatly in bringing the healthcare industry to their door step. This will help to reduce the congestion of the limited physical medical facilities we have in Nigeria³⁷. It will offer Nigerians the privilege of to access all types of medical services irrespective of where they live. It is no doubt that Metaverse has the much-needed medical opportunities and features that impact the Nigerian healthcare system greatly.

³⁴ Ibid

³⁵ Gurov Oleg, (2022). Panel discussion "The processes of reality creation: metaverses of visionaries and projects of its embodiment", *Artificial Societies*, 17(2)

³⁶ Ibid

³⁷ Sparkes Matthew, (2021). "What is a metaverse", *New Scientist*, Vol. 251 (3348), 18-32, [https://doi.org/10.1016/S0262-4079\(21\)01450-0](https://doi.org/10.1016/S0262-4079(21)01450-0)

Legal Frameworks Regulating the Metaverse in Medical Practice in Nigeria

The growing integration of the Metaverse with Nigerian healthcare has highlighted the necessity of assessing current legal frameworks to ensure proper navigation of this dynamic landscape³⁸. Nigeria's current legal precedents can act as a basic guidance even if the country does not currently have any laws specifically addressing Metaverse healthcare. For instance, the Nigeria Data Protection Regulation (NDPR), 2019. Having emphasised on that Nigerian legislators should be readily available to admit the Metaverse innovation into the Nigerian medical practice one area needed to amend the aforementioned law to allow the Metaverse³⁹ especially as it relates to data gathering, analysis, and data protection. The Data Protection Regulation Rule is intended to serve as the frontier law that guarantees the confidentiality of health-related data, which is seen in the legal profession as privileged information.

Apart from this, there are a number of legal principles, theories, and maxims on which the practice of metaverse within the Nigerian healthcare system could be based. Contract law, for example, regulates the contracts and relationships that support the exchanges between service platforms, healthcare providers, and Metaverse consumers. It is possible to use intellectual property rights to protect creative works of art and novel medical advancements that come from the virtual realm⁴⁰. Furthermore, there are numerous principles of the law of tort that are relevantly applicable to virtual medical practice as technology has come to stay. By these principles all legal disputes as result of virtual medical negligence and the like can be addressed by the means of this principle of tort. It is safe therefore, to conclude that Metaverse is not without legal framework in Nigeria.

However, there is the need for the Nigerian legislators to enact a law that is dedicated to the practice of metaverse within the Nigerian healthcare system. This will enhance the practice and bring its existence

³⁸ Ibid

³⁹ Ibid.

⁴⁰ Koos Stefan, (2022). Digital Globalization and Law. *Lex Scientia Law Review*, 6(1), 33–68.

to the awareness of so many Nigerians who are not yet aware of this reality. Since there are different important things involved in this practice, namely personal information which deserves protection, the issue of digital property rights which may be subject to dispute, virtual healthcare license for those who provide such services, ethical considerations among others⁴¹ etc. Nigeria government and its numerous institutions should learn from countries that have keyed into this practice and then collaborate with individuals home and abroad who can help her to come up with a very good legal framework that will incorporate Metaverse into medical practice or healthcare system in Nigeria starting with the institution they are being taught to the field where they practice.

Furthermore, because Metaverse healthcare is a global field, it is appropriate to emphasize once again how important it is for countries to work together to unify legal and ethical norms. The issues of cross-border health data exchange, virtual medical practitioners' qualifications being recognized, and consumer rights being protected in cross-border Metaverse healthcare services should all be addressed by this collaboration. While, it is important that Nigeria should enact a law that will give Metaverse a solid foundation in Nigeria it is important that certain factors must also be put straight. This is that before enacting any law there should be proper evaluation of the existing laws by virtue of which the practice of metaverse can be justified, proper study could be done of other jurisdictions so as to appreciate the practice there and also study their laws of metaverse.

Institutional Framework of Overseeing Metaverse in Medical Practice in Nigeria

With the growth of the metaverse in medical practice, Nigeria is poised to make some unique adjustments in the way healthcare is delivered⁴². This is because Virtual reality (VR), augmented reality (AR), and blockchain transforming the healthcare space, Nigeria needs to create

⁴¹ Ibid

⁴² Schmid J. F. . (2024). Telehealth and the Metaverse ConVerge2Xcelerate 2023 Keynote . Telehealth and Medicine Today, 9(1).
<https://doi.org/10.30953/thmt.v8.442>

an adequate institutional framework to monitor and control medical practice within these digital environments. This oversight is imperative for the welfare of patients, the safety of the data, and for ensuring technology is not misused in medical care⁴³. With the incorporation of a metaverse institutional framework, the Nigerian government must also allow the adoption of new and emerging technologies in healthcare regulation. But still, this is a long way off to say that this proposed framework will be able to target the requirements that the metaverse presents appropriately.

It must be noted that setting up institutions to oversee Healthcare regulation in the metaverse, could involve leveraging existing institutional bodies and additional potential bodies that could be relevant as it concerns digital technology⁴⁴. Hence, using the existing healthcare regulators and potential new regulatory units in the newly formed hybrid field of digital health is a good innovation to strengthen the institutional framework. Authorities such as the Medical and Dental Council of Nigeria (MDCN) may need to, particularly for the foreseeable future, take the lead in monitoring the virtual delivery of medical practice, ensuring that practitioners meet existing standards in the online world as stringently as they would in the traditional space⁴⁵.

Furthermore, the National Health Insurance Scheme (NHIS) may also extend the coverage of telemedicine and virtual healthcare as part of the new regulation to ensure that Nigerians who wish to participate in the

⁴³ Obisesan, O., Aidonjio, P., Onwubiko, K., & John, D. (2024). Intimate Partner Violence (IPV), the Culture of Silence: Telemedicine as Panacea and Its Challenge in Nigeria. *NIU Journal Of Humanities*, 9(2), 21-32.

⁴⁴ Absi, M. Y., & Williams, C. (2018). The Role of Digital Health in Making Progress Toward Sustainable Development Goal (SDG) 3 in Conflict-Affected Populations. *International Journal of Medical Informatics*, 114, 114–120.
<https://doi.org/10.1016/j.ijmedinf.2017.11.003>

⁴⁵ Aderson, C., Baskerville, R. L., & Kaul, M. (2017). Information Security Control Theory: Achieving a Sustainable Reconciliation Between Sharing and Protecting the Privacy of Information. *Journal of Management Information Systems*, 34(4), 1082–1112.

new digital economies can attain affordable healthcare services⁴⁶. Also, the Nigerian NITDA government is indeed best placed to influence many policy directions to develop best practices around cyber security, data ethics, and responsible application of AI health technologies in sources where they are mostly required, the metaverse. In this regard, since the metaverse utilizes a large amount of data, usually, we see access to these data through blockchain technology and other decentralised platforms⁴⁷; therefore, the positive guidelines issued by the NITDA concerning data protection will be very important in addressing the issue of the breach of patient data.

Partnering with cybersecurity experts in cases of breaches, data theft, and other cybercrime-related issues that threaten and disrupt the reliance on metaverse for medical care. Hence the a need to also incorporate the police and other law enforcement agencies in curtailing this incidence. Also, the Nigerian Communications Commission (NCC) will be very important for making the tech systems needed for the metaverse work in healthcare. In this regard, the metaverse can be made more accessible to the masses by providing inexpensive high-speed internet service in the most distant locations of the country⁴⁸. The NCC will, through the telecommunications providers, help in the specification of standard connectivity requirements that could support safe and uninterrupted virtual consultations with medical experts.

Concerning the above, it suffices to state that this technological architecture would be important in solving equity problems of access to metaverse healthcare aimed at bridging huge gaps in service provisions online that are left unfilled. Also, having a reliable institution ensures a

⁴⁶ Adewale, O. S. (2004). An Internet-Based Telemedicine System in Nigeria. *International Journal of Information Management*, 24(3), 221–234.

⁴⁷ Adrawal, A., & Alharbe, N. R. (2019). Need and Importance of Healthcare Data Integrity. *International Journal of Engineering and Technology*, 11(4), 854–859. <https://doi.org/10.21817/ijet/2019/v11i4/191104033>

⁴⁸ Adronis, K., & Moysey, K. (2013). Data Governance for Health Care Providers. In *Health Information Governance in a Digital Environment* (pp. 299–301). IOS Press. <https://doi.org/10.3233/978-1-61499-207-3-299>

Legal and Medical Issues concerning the Use of Metaverse in Medical Practice

This virtual reality, Metaverse is an innovation that has come to link the real world with digital world such that virtual interactions, transaction and services has greatly enhanced. Industries, institutions, and organisations including the health sector that have subscribed into the metaverse system must have witnessed several improvements⁴⁹. It is not subject to dispute that incorporating metaverse in the Nigerian healthcare system will be of great advantage but it is not without its disadvantage as disadvantage is inevitable to anything that has advantages. The disadvantage as used in this context simply refers to certain requirements under the Nigerian Law that regard must first be had to and then the possible side effect and health hazards that goes with the Metaverse. Over the years, some health hazard associate with Metaverse has been identified and they are itemised and explained hereunder.

i. Regulation and Licensing

Another issue that is worth critical consideration is the issue of legal frameworks for Metaverse in Nigeria. Everything must be backed by law to thrive in any given society. There are laws, principles and legal theories that can justify the practice of metaverse in Nigeria as earlier stated. However, the fact that there is no official law that is dedicated to this purpose is a call for concern. This is because, of the uncertainty and lack of explicit legislation on virtual medical practitioners in Nigeria.

⁴⁹ Aidonojie Paul Atagamen, Toyin A. Micheal, Obieshi Eregbuonye, and Ogbemudia I. Ottah (2024), "Legal Issues Concerning of Data Security and Privacy in Automated Income Tax Systems in Nigeria", *Hang Tuah Law Journal*, 8(1), 14-41, <https://doi.org/10.30649/htlj.v8i1.223>; Aidonojie Paul Atagamen, Majekodunmi T. Afolabi, Eregbuonye Obieshi and Adeyemi-Balogun O. Janent, (2024), Potential and Legal Challenges of Metaverse for Environmental Awareness and Sustainable Practice in Nigeria: A Comparative Study with Singapore, *Administrative and Environmental Law Review* 5 (1):37-64. <https://doi.org/10.25041/aclr.v5i1.3230>.

ii. Informed Consent and Liability for Medical Error in Virtual Treatment

Informed Consent is a prerequisite to any important medical decision on a patient. But record and practice has shown that getting informed consent from patient in Metaverse is not easy. Every medical practitioner who does not want to have ethical issues must ensure he get the consent of his patient directly or indirect before treating him. This is not easy in Metaverse and there could be the possibility of compromise and this is very fatal to medical practice. The second limb of the issue bother on establishing medical errors or negligence on Metaverse. It has been adjudged to be very difficult to determine liability for medical errors and complex legal dilemma is common.

iii. Virtual Reality Sickness (Cybersickness) and Prolonged Sedentary Behavior

Record has shown that when Metaverse is used for too long it could symptoms of virtual reality Sickness simply referred to as cybersickness. The wide range of signs that indicates this includes but not limited to nausea, disorientation and dizziness. It is unfortunate that the people who often fall victim of cybersickness are healthcare providers because they use it regularly and constantly. Once they are affected it will show in their service deliveries because it cause discomfort which in turn impacts on efficiency and effectiveness of the such healthcare service provider⁵⁰. It has been gathered that users of metaverse often get addicted and as a result spend extended time on the platform which led to health problems that impacts of on their physical well-being⁵¹

iv. Ergonomic Challenges

Study has shown that healthcare providers who often use Metaverse to provide service for their patients or train aspirants for quite often may encounter ergonomic problems that usually affect their general wellbeing thereby impacting badly on their job and services. This is said to be caused when a user uses controller or gestures to interact with digital interfaces quite often.

v. Virtual Reality Stress and Ethical Dilemmas

⁵⁰ Glushchenko Idar, (2021). Development of Virtual Migration in the Context of the Ongoing Digitalization. DEMIS.Demographic Research, 1(2), 57–64.

⁵¹ Ibid

Virtual stress and ethical dilemmas have been identified as one of the issue that Metaverse users are confronted with. This happens when it is used for long period of time. Virtual Reality Stress comes in diverse ways such as worries, sensory overload or isolation, that is the person begins to detach himself from reality. Furthermore, there are certain medical conditions that require ample time to address, and that could be prolonged by several factors. In this case, both the healthcare provider and the patient may run the risk of being stressed. Some medical practitioners as a result of this stress normally end up in ethical problems and dilemmas.

vi. Patient Data Privacy and Glitches Metaverse

The importance of patient confidentiality and data privacy cannot be overemphasized. In Nigeria today it is one of the fundamental rights for every Nigeria Citizen⁵². To this end, strict compliance with patients' personal data privacy is very paramount to them as that is what gives confidence in a particular medical practitioner. The arrangement toward this on Metaverse is strong. However, it is unfortunate that it is possible for data privacy to be compromised on Metaverse. Furthermore, Glitches are inevitable in technological devices. Given this fact, glitches should be expected in Metaverse because the same technological devices are being used. It could occur at the end of the healthcare provider or at then do the patient either way affect and disrupt the medical services being rendered and may dispose patients to risk⁵³. In summary therefore, in their service deliveries healthcare providers on Metaverse could suffer disruptions from as result of glitches which not good enough.

Concerning the above, it is crystal clear that, Metaverse has so much legal complexities and health issues that may seem overwhelming and on the ground of which it could be disregarded. But suffice to say that Metaverse remains an innovation that hold great potential for the future of medical practice in and outside Nigeria. To this extent, medical practitioners, the ministry of health, medical professional organisations together with government should work toward incorporating and

⁵² See Chapter IV of the Constitution of the Federal Republic of Nigeria 1999 as amended.

⁵³ Ibid

creating thriving environment for this practice in Nigeria as doing this will mean overcoming of its significant setback in Nigeria.

Data Presentation and Analysis

The presentation and analysis of the data generated through the questionnaire used in this study are hereby analyse and discuss as follows.

Sample Size and Selection Method

To ensure the representativeness of the study, a sample size of 256 respondents (who are medical personal) residing in the Federal Republic of Nigeria was carefully chosen. The selection of respondents was conducted using a simple random sampling method. Several advantages are associated with this method⁵⁴, including:

⁵⁴ Aidonojie Paul Atagamen, Nwazi Joseph and Ugiomo Eruteya, (2023), “Illegality of Income Tax Evasion in Edo State: Adopting an Automated Income Tax System as a Panacea”, *Jurnal Legalitas*, 16(1), 56-86; Aidonojie Paul Atagamen and Edetalehn O. Idemudia, (2023), “A Facile Study of the Statutory Challenges Concerning Customary Practice of Intestate Succession in Nigeria”, *Jurnal Hukum Replik*, 11(1), 1-11; Aidonojie Paul Atagamen (2023), “Voluntary Assets and Income Declaration Scheme a Panacea to Tax Evasion in Edo State, Nigeria”, *Administrative And Environmental Law Review*, 4(1), 1-20, <https://doi.org/10.25041/aclr.v4i1.2822>; Aidonojie Paul Atagamen (2023), “Environmental Hazard: The Legal Issues Concerning Environmental Justice in Nigeria”, *Journal of Human Rights, Culture and Legal System*, 3(1), 17-32, <https://doi.org/10.53955/jhcls.v3i1.60>; Aidonojie Paul Atagamen, (2023), “The Legal Impact and Relevance of using the Concept of Plea Bargain in Resolving Tax Dispute in Nigeria”, *Branjajaya Law Journal: Journal of Legal Studies*, 9(2), 44-63; Aidonojie Paul Atagamen (2022), “The Societal and Legal Missing Link in Protecting a Girl Child against abuse before and Amidst the Covid-19 Pandemic in Nigeria”, *Jurnal Hukum UNISSULA*, 38(1), 61-80; Aidonojie Paul Atagamen and Francis Esther Chetachukwu, (2022) “Legal Issues Concerning Food Poisoning in Nigeria: The need for Judicial and Statutory Response”, *Jurnal Media Hukum*, 29(1), 65-78, <https://doi.org/10.18196/jmh.v29i1.12595>; Majekodunmi, T. Afolabi, Oluwaseun A. John, Idahosa M. Ekata, Ikubbanni, O. Oluwaseye and Aidonojie Atagame Paul, (2022), “The causes of the Rising incidence of Terrorism occasioning Deprivation of the Right to Life in Nigeria”, *KIU Journal of Humanities*, 7(2), 5-19; Oladele O. Olukayode,

- i. Simple random sampling allows for the selection of respondents from a homogeneous population. This ensures that the participants share common characteristics that are relevant to the study.
- ii. The use of a random sampling technique is well-regarded for its ability to obtain unbiased results. It minimizes the potential for selection bias and enhances the credibility of the findings⁵⁵.

Aidonojie Paul Atagamen, Uzualu E. James, Ikubanni, O. Oluwaseye and Oyediji I. Adefisayo, (2022), "An Empirical Study of Criminalizing Minor Infractions of Tax Laws in Nigeria: The Need for Negotiated Punishments", *KIU Journal of Humanities*, 7(2), 23-35; Aidonojie Paul Atagamen, Aidonojie Esther Chetachukwu, Majekodunmi T. Afolabi, Eregbuonye Obieshi, Adesoji K. Adebayo (2024) "The Competence and Authority of Midwives in giving Birth without the assistance of a Doctor in Nigeria" *Jambura Law Review*, Vol. 6(1), 150-182; Aidonojie Paul Atagamen, Adebayo, K. Adebayo, Eregbuonye Obieshi, Wakili S. Abacha, (2024), "Breaking Legal and Socio-economic Challenges to Plastic Waste Regulation in Nigeria: Lessons learned from Singapore", *Yustisia*, 13(1), 64-88; Aidonojie Paul Atagamen, Aidonojie Esther Chetachukwu, Mulegi Tom, and Eregbuonye Obieshi., (2024), Legal Issues Concerning Compulsory COVID-19 Vaccination: Nigeria as a Case Study, *Golden Ratio of Law and Social Policy Review*, 3(2), 74-83, <https://doi.org/10.52970/grlspr.v3i2.349>; Aidonojie Paul Atagamen, Eregbuonye Obieshi, Inagbor Micheal, Ogbemudia Ottah, (2024), "Legal and Socioeconomic Issues Concerning the Nigeria Higher Institution Loan Act 2023", *JURNAL LEGALITAS*, 17(1), 1-23, <https://doi.org/10.33756/jelta.v17i1.23143>; Aidonojie Paul Atagamen, (2024), Challenges concerning the Legal Framework of an Automated Personal Income Tax in Edo State, Nigeria, *Jurnal Hukum Replik*, 12(1), 83-115, <http://dx.doi.org/10.31000/jhr.v12i1.7717>

- ⁵⁵ Aidonojie Paul Atagamen, Imoisi S. Ejokema, and Oaihimore E. Idemudia, (2022), "A Facile Study concerning the Prospect and Challenges of Conducting a Hybrid Method of Legal Research in Nigeria", *Euromentor Journal*, 13(3), 113-138; Aidonojie Paul Atagamen, Majekodunmi T. Afolabi, Ikubanni, O. Oluwaseye and Ibrahim Nathan, (2022), "The causes of the Rising incidence of domestic violence in Nigeria: Proposing Judicial Separation as a Panacea", *Jurnal Hukum UNISSULA*, 38(2), 61-80, <https://doi.org/10.26532/jh.v38i2.21592>

Aidonojie Paul Atagamen, Odojor A. Oyemwosa and Agbale O. Patient, (2021), "The Legal Impact of Plea Bargain in Settlement of High Profile Financial Criminal Cases in Nigeria", *Srinijaya Law Review*, 5(2), 161-174, <https://doi.org/10.28946/slrev.Vol5.Iss2.852.pp161-174>; Aidonojie Paul Atagamen, Ikubanni O. Oluwaseye, and Oyebade A. Adeniyi, (2022). 'Legality of EndSARS Protest: A Quest for Democracy in Nigeria' *Journal of Human*

- iii. The simplicity of the random sampling technique makes it suitable for this study, as it facilitates the selection of respondents from diverse cultural backgrounds.
- iv. In the context of this study, the simple random sampling technique is more appropriate and preferable when compared to non-doctrinal or empirical legal research methods.

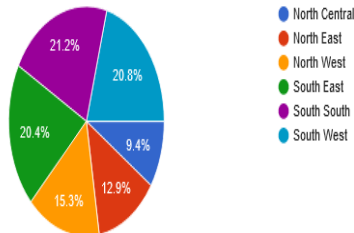
Data Analysis

The data collected from the distributed questionnaires underwent a meticulous analysis process. The results are presented in both graphical and tabular formats, which enhance clarity and facilitate ease of interpretation. This approach ensures that the findings are not only comprehensive but also easily understandable to the audience.

Research Question One and Two

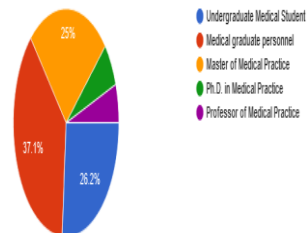
Which of the following Geopolitical Zones in Nigeria do you reside in?

255 responses



What is your medical educational level?

256 responses



Rights, Culture and Legal System, 2(3), 209-224, <https://doi.org/10.53955/jhcls.v2i3.40>; Idahosa Milicent Ekata, Agbale Omohotse, and Aidonojie Paul Atagamen, "The Causes and Legal Implications concerning Assault against Healthcare Providers by Patients or their Relatives in Nigeria", *KIU Journal Of Humanities*, 7, no. 4, (2023): 79-88. <https://doi.org/10.58709/kiujhu.v7i4.1558.79-88>; Majekodunmi, T. Afolabi, Oluwaseun A. John, Aidonojie Atagamen Paul Ikubbanni, O. Oluwaseye, and Oyebade A. Adeniyi, (2022), "Legal Issues in Combating the Scourge of Terrorism; Its Impact on International Trade and Investment: Nigeria as a Case Study", *KIU Journal of Humanities*, 7(3), 129-139

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Prospect, Legal, and Health Risks in Adopting The Metaverse in Medical Practice: a Case Study of Nigeria
Figure 1 and 2: Respondents stating various location they reside in Nigeria

Figure 1 and Figure 2 are valid respondents identifying particular location they reside in the various geo-political zones in Nigeria. Furthermore, confirming the fact that the respondents are medical practitioner in Nigeria.

Research Question Three

Have you had any experience with the Metaverse technology?

256 responses

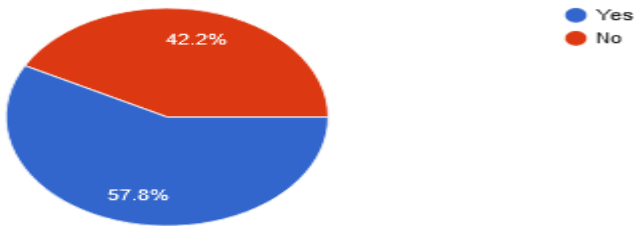


Figure 3: Respondents identifying their experience with the metaverse technology

	Response	Percent
Valid Yes	148	57.8%
Valid No	108	42.2%
Total	256	100%

Table 3: Valid respondents identifying their experience with the metaverse technology

Figure 3 and Table 3 are confirmation of the respondent’s experience concerning their experience with the metaverse technology.

Research Question Four

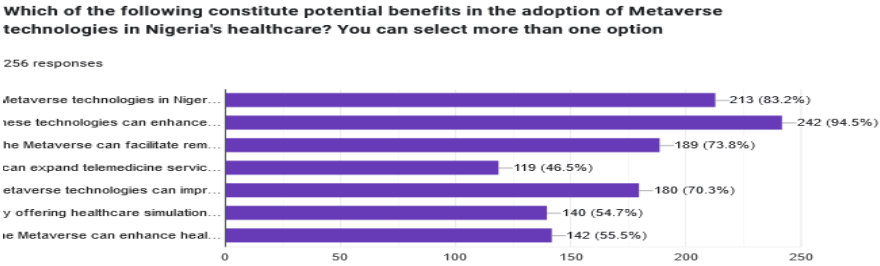


Figure 4: Identification of potential benefits of the adoption of Metaverse technologies in Nigeria's healthcare

potential benefits of Metaverse technologies in Nigeria's healthcare	Cluster Response	of Percentage
Metaverse technologies in Nigeria's healthcare can enable virtual consultations, improving access to medical advice and diagnoses, especially in remote areas.	213	83.2%
These technologies can enhance medical education by offering advanced training and simulations for healthcare professionals, fostering skill development.	242	94.5%
The Metaverse can facilitate remote patient monitoring, benefitting those with chronic conditions and aiding in real-time disease management.	189	73.8%
It can expand telemedicine services, making it easier for healthcare providers to reach a broader patient population, and enhance healthcare accessibility.	119	46.5%
Metaverse technologies can improve patient engagement and education through virtual reality and augmented reality, aiding in	180	70.3%

health understanding and management.		
By offering healthcare simulations, they enable medical students and professionals to practice procedures safely, reducing real-life training risks.	140	54.7%
The Metaverse can enhance health records management through blockchain technology, ensuring data privacy and interoperability, and benefiting patient information security.	142	55.5

Table 4: Valid identification of potential benefits of the adoption of Metaverse technologies in Nigeria's healthcare

Figure 4 and Table 4 are clusters of valid identification of the potential benefits of the metaverse technology in Nigeria's health care system.

Research Question Five

Do you agree that there are legal and medical challenges in using the Metaverse for medical practice in Nigeria?

256 responses

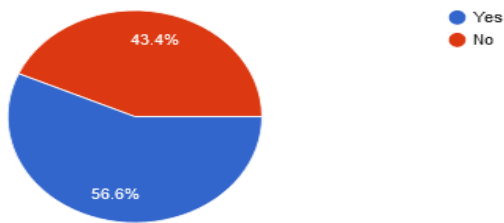


Figure 5: Confirmation of legal and medical challenges in using the Metaverse for medical practice in Nigeria

	Response	Percent
Valid Yes	145	56.6%
Valid No	111	43.4%
Total	256	100%

Table 5: Valid confirmation of legal and medical challenges in using the Metaverse for medical practice in Nigeria

Figure 5 and Table 5 are valid confirmation by the respondents of the legal and medical challenges that may occur in adopting the metaverse technology in Nigeria health care system.

Research Question Six

Which of the following legal and medical challenges do you foresee in using the Metaverse for medical practice in Nigeria? You can select more than one option

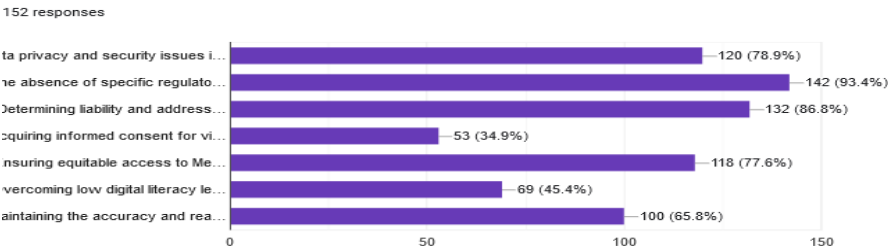


Figure 6: Identification of legal and medical challenges of adopting the Metaverse for medical practice in Nigeria

legal and medical challenges of adopting the Metaverse in Nigeria healthcare	Cluster of Responses	Percentage
Data privacy and security issues in the Metaverse create legal and medical challenges.	120	78.9%
The absence of specific regulatory frameworks for Metaverse healthcare poses significant legal and medical hurdles.	142	93.4%
Determining liability and addressing malpractice in virtual healthcare settings raises complex legal and medical concerns.	132	86.8%
Acquiring informed consent for virtual medical procedures presents a challenge to protect patient rights.	53	34.9%
Ensuring equitable access to Metaverse technology, particularly in underserved areas.	118	77.6%

in remote areas, is a medical challenge with potential implications for healthcare disparities.	69	45.4%
Overcoming low digital literacy levels among patients and healthcare providers is a critical challenge.	69	45.4%
Maintaining the accuracy and realism of medical simulations and treatments within the Metaverse poses a medical challenge for ensuring the quality of care.	100	65.8%

Table 6: Valid cluster of legal and medical challenges of adopting the Metaverse for medical practice in Nigeria

Figure 6 and Table 6 are valid cluster of identification of the legal and medical challenges that may occur in adopting the metaverse in Nigeria healthcare system.

Research Question Seven

Which of the following could serve as a possible remedy for a responsible and safe adoption of the Metaverse in practice in Nigeria? You can select more than one option

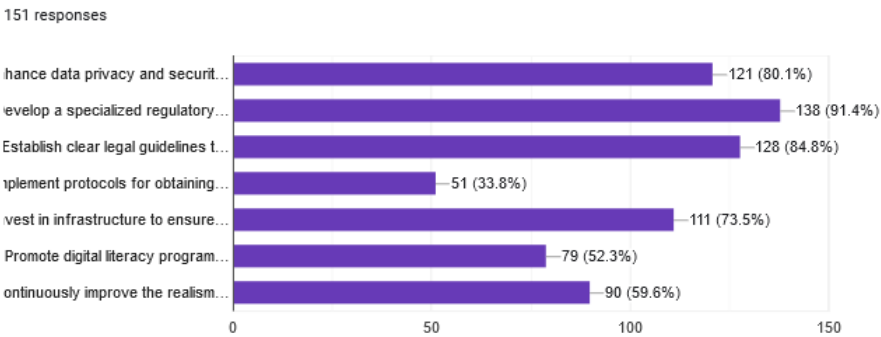


Figure 7: Identification of remedy for a responsible and safe adoption of the Metaverse in practice in Nigeria

Remedies for a safe adoption of Metaverse in Nigeria's healthcare	Cluster of Responses	Percentage
Enhance data privacy and security measures, including encryption and access controls, to protect patient data in the Metaverse.	121	80.1%
Develop a specialized regulatory framework for Metaverse healthcare, addressing licensing and accreditation.	138	91.4%
Establish clear legal guidelines to determine liability for medical errors and malpractice in virtual healthcare.	128	84.8%
Implement protocols for obtaining informed consent in virtual medical procedures.	51	33.8%
Invest in infrastructure to ensure equitable access to Metaverse technology, reducing healthcare disparities.	111	73.5%
Promote digital literacy programs for patients and healthcare providers to facilitate effective use of Metaverse technologies.	79	52.3%
Continuously improve the realism and accuracy of medical simulations in the Metaverse to maintain high-quality care.	90	59.6%

Table 7: Valid cluster of remedies for a responsible and safe adoption of the Metaverse in practice in Nigeria

Figure 7 and Table 7 are valid clusters of respondents' identification of the possible remedy for a responsible and safe adoption of the Metaverse in practice in Nigeria.

Discussion of Findings

The findings from the study provide essential insights into various aspects of the respondents' perceptions, experiences, and challenges related to the adoption of Metaverse technology in Nigeria's healthcare system. In Figures 1 and 2 reveal the geographic locations of the respondents across Nigeria's geopolitical zones, confirming the representation from various regions. These findings validate that the respondents are medical practitioners in Nigeria, ensuring a relevant and diverse sample. In this regard, Figure 3 and Table 3 confirm that 57.8% of valid respondents have experience with Metaverse technology, while 42.2% do not. This information is crucial for understanding the baseline knowledge and experience of medical practitioners in Nigeria regarding Metaverse technology.

Furthermore, in Figure 4 and Table 4 the respondents identify the potential benefits of adopting Metaverse technologies in Nigeria's healthcare system, and the findings are as follows:

- i. 83.2% of respondents believe that Metaverse technologies can enable virtual consultations, improving access to medical advice and diagnoses, especially in remote areas.
- ii. 94.5% see the potential for enhancing medical education by offering advanced training and simulations for healthcare professionals, fostering skill development.
- iii. 73.8% believe that the Metaverse can facilitate remote patient monitoring, benefiting those with chronic conditions and aiding in real-time disease management.
- iv. 46.5% envision the expansion of telemedicine services, making it easier for healthcare providers to reach a broader patient population and enhance healthcare accessibility.
- v. 70.3% think that Metaverse technologies can improve patient engagement and education through virtual reality and augmented reality, aiding in health understanding and management.
- vi. 54.7% see the potential for offering healthcare simulations, enabling medical students and professionals to practice procedures safely, reducing real-life training risks.
- vii. 55.5% believe that the Metaverse can enhance health records management through blockchain technology, ensuring data

privacy and interoperability, and benefiting patient information security.

However, despite the potential benefit of adopting the Metaverse in medical practice, Figure 5 and Table 5 further confirm that 56.6% of valid respondents acknowledge the existence of legal and medical challenges in adopting Metaverse technology in Nigeria's healthcare system. In this regard, in figure 6 and Table 6, the respondents identifies specific clusters of legal and medical challenges associated with adopting the Metaverse in Nigeria's healthcare system, and the findings are as follows:

- i. 78.9% of respondents consider data privacy and security issues in the Metaverse to create legal and medical challenges.
- ii. 93.4% see the absence of specific regulatory frameworks for Metaverse healthcare as posing significant legal and medical hurdles.
- iii. 86.8% find that determining liability and addressing malpractice in virtual healthcare settings raises complex legal and medical concerns.
- iv. 34.9% express concerns about acquiring informed consent for virtual medical procedures to protect patient rights.
- v. 77.6% acknowledge the challenge of ensuring equitable access to Metaverse technology, particularly in remote areas, as a medical challenge with potential implications for healthcare disparities.
- vi. 45.4% highlight the critical challenge of overcoming low digital literacy levels among patients and healthcare providers.
- vii. 65.8% point out that maintaining the accuracy and realism of medical simulations and treatments within the Metaverse poses a medical challenge for ensuring the quality of care.

Figure 7 and Table 7 provide clusters of responses regarding possible remedies for a responsible and safe adoption of the Metaverse in medical practice in Nigeria. The percentages reflect the respondents' suggestions:

- i. 80.1% suggest enhancing data privacy and security measures, including encryption and access controls, to protect patient data in the Metaverse.

- ii. 91.4% emphasize the need for developing a specialized regulatory framework for Metaverse healthcare, addressing licensing and accreditation.
- iii. 84.8% stress the importance of establishing clear legal guidelines to determine liability for medical errors and malpractice in virtual healthcare.
- iv. 33.8% recommend implementing protocols for obtaining informed consent in virtual medical procedures.
- v. 73.5% highlight the necessity of investing in infrastructure to ensure equitable access to Metaverse technology, reducing healthcare disparities.
- vi. 52.3% propose promoting digital literacy programs for patients and healthcare providers to facilitate effective use of Metaverse technologies.
- vii. 59.6% believe in continuously improving the realism and accuracy of medical simulations in the Metaverse to maintain high-quality care.

These findings offer a comprehensive understanding of the perspectives, experiences, benefits, challenges, and potential solutions related to the adoption of Metaverse technology in Nigeria's healthcare system. The percentages indicate the significance of these factors and provide valuable guidance for policymakers and stakeholders aiming to integrate the Metaverse effectively into the healthcare sector in Nigeria.

Conclusion/Concluding Remarks

The evolvement of metaverse in the healthcare system is suggestive of a great and significant shift in the paradigms of medical practice in the world. This is a plus for technology but a challenge for the world especially those in the medical field to accept the innovation and seek to keep in pace with this phenomenal development. To be able to do this, there must be a thriving environment for this practice which start with a legal framework that enables and legitimatizes it. Once, there is a legal framework for it will thrive.

However, it suffices to state that the metaverse concept is required in a developing country like Nigeria that has encounter several challenges concerning its conventional healthcare system. This is significance because Metaverse is important to the Nigerian healthcare system and it has a promising future for the medical profession as it has

placed it at the virtual arena. Furthermore, it also results to improving patient engagement, training of medical personnel, and simulation-based learning. Practitioners could easily render medical services to patients in remote areas through realistic virtual consultation and training of medical personnel. The study further identifies though there are several prospect of the metaverse concept to the Nigeria healthcare system, however, there are legal and medical risks associated with the metaverse concept in medical practice in Nigeria. These challenges involve patient data privacy, regulation, licensing, patient consenting to virtual medical treatment, and accountability for medical errors in the metaverse. The study therefore recommends that for effective use of the metaverse concept in enhancing medical practice in Nigeria, there is need for legal, ethical and medical regulation of the incorporation of the metaverse concept in medical practice in Nigeria

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