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Digital Divide and Access: Addressing Disparities in Artificial Intelligence (Ai) Health Information for Nigerian Rural Communities

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Abstract

Artificial Intelligence (AI) has globally been acknowledged to be a force to reckon with in improving diverse sectors of human endeavours. AI, being the most prominent example of digital technology, is acclaimed to have the ability to revolutionize communication and healthcare industries by providing information and healthcare services even to underserved communities. AI has thrown societies into an era where access to information, particularly in the realm of artificial intelligence, holds significant implications for social, economic, and political empowerment. AI in medical practice is still in the infancy stage in sub-Saharan Africa, Nigeria inclusive. The little adoption of AI in the Nigerian healthcare sector is majorly concentrated in urban communities. Rural Nigerians face significant challenges in accessing vital health information, particularly with the emergence of AI technologies causing disparities in AI health information access exacerbated by the digital divide. Despite the potential of AI to revolutionize healthcare, rural communities are hindered by limited internet connectivity, inadequate infrastructure, socioeconomic constraints, and disparities in digital literacy. The paper therefore employed a qualitative research approach using systematic reviews to explore the multifaceted barriers preventing rural Nigerians from accessing AI-based health information and examines the implications of these disparities on healthcare outcomes and patient empowerment. Drawing upon existing literature and data, the paper proposes strategies to address the digital gap and promote equitable access to AI-driven healthcare information dissemination ensuring that rural populations are not left behind in the era of digital health innovation. It concluded that addressing the disparities is sure to improve healthcare outcomes and patient empowerment. The researchers recommended collaborative efforts involving all stakeholders in mitigating the divide and promoting equitable access to AI health information, thereby fostering a more inclusive and just society. The paper is anchored on Digital Divide Theory and Community-Based Participatory Research (CBPR).

Keywords: digital divide, artificial intelligence, access, health information, disparities

Introduction

The rapid and steady evolution of digital technology has brought about significant changes in the way human beings live their lives. Digital technology is any digital device, system, and resource that helps create, store, and manage data (Hovsepyan, 2022). Artificial intelligence (AI) is the most prominent example of digital technology that has been changing the world today and which must have made Hovsepyan (2022) to avow that digital technology starting from smartphones to vehicles is no longer seen as science fiction. This implies that people did not believe and accept the great works of digital technology at inception. Sraders (2019) cited in Wilson (2021, p. 35) defines AI as the science and engineering of making intelligent computerized machines that are programmed to closely imitate human thoughts and actions to analyze data to address a variety of problems or execute tasks.

Artificial intelligence according to Robinson (2018) is the ability of a digital computer, computer-controlled machine, or robot to perform tasks commonly associated with human intelligent beings like humans. Consequently, Casey (2019) cited in Wilson (2021, p. 35) states that AI is not new and has become a technology of great importance which is not predictable. AI is not predictable because it is greatly evolving and therefore what it will be capable of doing in years to come is unknown. Similarly, Robinson (2018) submits that AI has been around for a long time and is taking the world by storm considering the application of its innovative uses in virtually all industries.

In her submission, Hanna (2021) affirms that AI digital technology is expanding the digital divide which was in existence before the late 20th century and was chiefly referred to then as the division between those with and without telephone access and later as the split between those with and without internet access. Those with telephone and internet access can be likened to those who are better endowed and living in the urban cities while those without telephone and internet access can be likened to the poor rural residents. There is a more obvious lack of digital technologies or ICTs in Nigerian rural communities than there is in the urban communities.

Many contentious issues surround AI. While some scholars think that AI is a welcome development, others see it as a bad omen because of the effects the technology is having on every aspect of human life. For instance, Elon Musk, the technology billionaire and Twitter CEO is of the view that AI is dangerous for humanity's future and threatens people's jobs and privacy irrespective of the fact that AI automates a myriad of rigid human tasks in healthcare, finance, and other sectors (Hovsepyan, 2022). There is fear of AI's potent dangers, especially the potential to continue to perpetuate inequalities if it remains unmitigated (Gurevich, 2023). There is therefore the need to mitigate the inequalities perpetuated by AI to avert its potential dangers especially in Nigeria.

In their submissions, Wu (2022) thinks that AI is both growing and decreasing different information divide while Bozic (2023) maintains that lack of AI technology can widen the digital divide, especially in developing nations as it limits the opportunities for these nations to benefit from AI-driven applications. AI's ability to grow the information divide implies that AI can perpetuate inequalities in health information access while its ability to decrease the information divide suggests its ability to address the inequalities and thus bridge the digital divide. It can then be inferred that in whichever way scholars perceive AI technology, the truth remains that it has come to stay whether it is appreciated or not. Fayoyin (2021) submits that we are in an era of unprecedented digital revolutions.

AI technology is a global issue of public concern that must be embraced if anybody or a nation wants to remain relevant in our world today. The digital divide it causes cuts across many demographics which possibly made Hanna (2021) submit that the digital divide typically exists between those in urban areas and those in rural areas; between the educated and uneducated; between socio-economic groups, and globally, between the more and less industrially developed countries. It also cuts across many continents causing inequitable distributions of the gains of AI across the globe Nyam (2021 p. 8). This implies that inequitable access to AI-based health information is not only a developing countries affair but a global one.

Even in better-organized and endowed nations, there still exists inequitable access to AI-based health information but the level of the inaccessibility marks the difference. The

inequitable access is possible so long as vulnerable people exist everywhere across the globe and so long as some people are poor and have unequal access to electricity, ICTs, and internet services that power AI. Access to AI health information is domiciled in areas where availability and accessibility to ICTs abound. ICTs are of course the exclusive or luxury of digitally friendly people who are privileged to live in urban areas and not for the digitally marginalized people in the rural areas. This spells bad for the overall development of any nation especially Nigeria with numerous rural communities

The UN Secretary-General was quoted to have said that the safe deployment of new technologies including AI, can help the world to achieve the Un Social Development Goals which include the healthcare objectives (MyProject, 2024). AI provides health information such as suggesting drug dosages, identifying treatments, and helping in surgical procedures in the operating room Frankenfield (2023). Collaborating AI use in a healthcare setting, Khedkar & Reiss (2024), reiterates that AI has been hailed as the answer to a wide range of persistent healthcare challenges such as identifying small anomalies in scans, classifying patients, maintaining and tracking medical records, and dealing with health insurance claims. Similarly, UNCTAD (2021) notes that technology has always been a critical tool for addressing health issues even though not everyone has equal access to the benefits due to the digital divide. The benefits of AI cannot be equally distributed because of the inaccessibility of the technology in rural areas.

The problem of the digital divide has persisted for years which make many developing nations unable to fully adopt and reap the benefits of digital health technologies and services (Ravi *et al*, 2024). The little digital technologies we have in Nigeria are majorly concentrated in the urban areas marginalizing the rural areas. The United Nations has made efforts towards bridging the digital divide by raising awareness regarding it and creating a ICTs Task Force, Hanna (2021), but the digital divide still stars the globe in the face. Despite advancements in AI technology and its potential to revolutionize healthcare information dissemination, rural communities in Nigeria continue to face significant disparities in accessing AI-based health information.

The digital divide persists as a barrier, preventing Nigerian rural residents from harnessing the benefits of AI technologies due to limited internet connectivity, inadequate infrastructure, socioeconomic constraints, and disparities in digital literacy. Lack of access to digital technology and AI technology, in particular, causes a digital divide between Nigerian urban and rural communities. The digital divide in turn causes disparities which are particularly evident in AI-driven health information access in rural communities where there is an acute lack of technologies impeding the quality of life of the majority of people living in the rural communities.

The digital divide and its attendant disparities need to be addressed for equitable AI-powered health information access for both communities if Nigeria is to achieve the health goals of the Sustainable Development Goals (SDGs). The disparities when addressed effectively are sure to help a lot of researchers become aware of AI algorithms and technology and hence understand the functioning of AI since Robinson's (2018) study revealed that many researchers in Nigeria are completely unaware of algorithms and therefore do not understand the functioning of AI. It will make business owners willing to invest in AI. People will have advanced technological skills to work well with and access AI health information.

Again, addressing the disparities effectively will improve the general health conditions of marginalized groups as AI health information can be better provided to them as the health of a nation is the wealth of the nation. Addressing the disparities too is sure to improve patient outcomes and thus help in achieving SDG health goals. The study might spur the powerful stakeholders (government, civil society organizations, policymakers, technology companies, businesses, NGOs, philanthropists, community members, etc) to provide the necessary digital tools: computers, ICTs, and internet facilities, for the rural residents and ensure their connectivity to the internet.

Also, bridging the digital divide is sure to improve digital literacy, digital skills democracy, social mobility, economic equality, and economic growth, Hanna (2021), especially in rural communities. Rural residents would master how to use digital technologies if the gap is addressed. The economic life of rural communities is sure to improve since many people

will start making money with their digital literacy. The digital divide still exists in urban areas with some access to technology and one can imagine the magnitude of the divide in rural areas with little or no access. By addressing the divide and disparities, this research endeavours to contribute to the development of inclusive and equitable approaches to AI-driven healthcare information, ensuring Nigerian rural populations are not left behind in the era of digital health innovation and therefore the contribution to knowledge. Addressing these issues is sure to give the rural communities a sense of belonging especially as Osinubi (2018) cited in Nyam (2021, p. 16) estimates that 40% of world businesses that are unable to adapt to AI and be compatible are most likely to die.

Research Questions

Three research questions are raised for this study thus:

1. What are the multifaceted barriers preventing Nigerian rural residents from accessing AI-based health information?
2. What are the implication of the disparities in AI-based health information access on healthcare outcomes and patient empowerment?
3. What strategies will address the digital gap and promote equitable access to AI-driven healthcare information dissemination in Nigeria?

Method

The study is a qualitative one using systematic reviews to identify, analyze, and synthesize all relevant research questions. Library Skills (2024) maintains that systematic reviews usually involves more than one person (author) in order to increase the objectivity and trustworthiness of the reviewers' methods and findings. It provides an unbiased and comprehensive summary of the existing evidence and like all research, systematic reviews should have a clear question and the perspective of the authors in their approach to addressing the question is described (Library Skills, 2024).

In their submission, Sing and Rase (2021) avow that a systematic review follows explicit methodology to answer a well-defined research question by searching the literature comprehensively, evaluating the quality and quantity of research evidence rigorously and analyzing the evidence to synthesize an answer to the research question. Similarly, Fulton Library (n.d.) is of the opinion that systematic reviews encompass a variety of methods that

involve gathering existing studies and research and then collectively analyzing them which helps to identify larger conclusions about a body of knowledge as well as identify gaps in that knowledge.

In conclusion, conducting a systematic review is definitely a valid research method in mass communication when exploring topics like the present one that involves gathering, evaluating and synthesizing existing research or all available evidence related to specific research questions and drawing conclusions.

Findings

Barriers Hindering Rural Residents' Access to AI-driven Health Information

Rural communities in Nigeria face formidable barriers regularly when it comes to accessing general healthcare services due to their many lacks and neglect and even more when it comes to accessing technological services due to the digital divide. The barriers or challenges that the rural residents face in accessing healthcare services contribute to health disparities (Rural Health Information Hub, 2024). World Health Organization's recent report shows a significant urban-rural divide in the distribution of healthcare resources in Nigeria with the majority concentrated in urban centers (Abiola, 2024).

Digital inequality showcases disparities in access to and usage of the internet and digital technology among individuals, groups, and nations (StudySmarter, 2024). It is the uneven availability of digital technologies, ICTs and uneven distribution of network connectivity in rural communities. The extent of the digital divide in Nigerian rural communities concerning access to AI-driven health information is caused by such barriers as:

- Lack of electricity. Choubey (2021) maintains that there are many people in different parts of the world to whom a power socket or an electric bulb in their houses is still a dream come true. There is no reliable electricity in Nigerian urban communities and worse in rural Nigeria. This impedes access to digital technologies and invariably access to AI-driven health information that works with electricity.
- Limited access to technologies. Nigerian rural communities often lack adequate ICT and internet access infrastructure including broadband connectivity. They have limited access to AI technologies and thus a great impediment to accessing AI health

information. Limited access to reliable ICTs and internet connections increases digital inequality causing disparities in accessing AI-driven health information which often requires high-speed internet for effective use. Repsol (2024) states that almost 3 billion people around the globe cannot access the digital environment causing a digital gap. A greater percentage of these 3 billion people must have come from the rural communities, the marginalized group.

- Geographical differences. Nigerian rural communities are geographically isolated and far from urban communities making it difficult for the residents to access healthcare facilities and in particular, AI-driven health information. Geographically advantaged places are more digitally connected than geographically disadvantaged ones. Also, existing infrastructure and resources are inadequately distributed with most services concentrated in urban tertiary health centers (Ravi *et al.,* 2024.)
- Low level of literacy and in particular, technological literacy. This is a serious challenge, especially in rural Nigeria. For one to access ICT skills, one must not only know how to read and write but must be digitally literate. Many rural Nigerians lack the necessary digital literacy skills to effectively navigate and utilize AI-driven health information technologies even when available. Also, the digital divide is more than having access to the technologies (Cambridge University Press and Assessment, 2024). Many people might have access to the technology without having the technological know-how which exacerbates the digital divide and disparities in accessing and understanding AI-driven health information available online.
- Poverty. Poverty has made many Nigerians vulnerable to certain negative conditions and lack. Poverty is one of the major reasons why rural communities cannot own internet-enabled devices such as smartphones, tablets, or computers thus limiting their ability to access AI-driven health information. They are generally low-income earners who cannot easily afford the cost of having the technological tools with which to access AI health information if available or pay for training to be digitally literate.
- Language and cultural barriers. Health information available online may not always be accessible or relevant to rural Nigerian communities due to language and cultural

differences. AI-driven health information platforms must consider language and cultural differences in Nigeria to effectively serve rural populations.

- Government Initiatives. Government policies and initiatives aimed at bridging the digital divide and improving internet access in rural communities can also influence the extent of the divide if not well implemented.
- Health Infrastructure disparities. The disparities in health infrastructure in rural communities can also impact access to AI-driven information. The Nigerian government's National Health Facilities Registry highlights the uneven distribution of healthcare facilities with urban areas having a higher concentration of better-equipped facilities (Abiola, 2024).
- Shortage of trained personnel. Trained ICT personnel are scarce in rural communities' health sector. This poses a challenge even when digital technologies are available. Also, there is insufficient training in novel digital tools, internet connectivity, and suboptimal technical support infrastructure (Ravi *et al.,* 2024.). Okoroafor (2021) cited in Mohammed and Shehu (2023) submits that the lack of skilled personnel and required systems for progress and growth is poor across the board in the health sector in Nigeria. This affects the rural residents' access to quality healthcare attention.
- Trustworthiness and bias. Many people still have contentious issues with AI and are biased over its use as a trending technology. They lack trust in its operations, especially in intruding on people's privacy and therefore challenge their acceptance and use of AI to provide them health information. Patients may not agree for their data to be shared with robots or machines. Unreliable results might occur if the training data for a model is biased.

Empirical Review of Literature

Literature on AI health information access in Nigeria seems emerging even when AI has been used in Nigeria for various purposes such as diagnosing diseases, managing supply chains, detecting fake drugs, and educating health workers (STEMFocus, 2023). Literature in the field also seems emerging possibly because AI adoption in Nigeria is still in the infantry stage.

A study by Mohammed and Shehu (2023) employed a narrative review to highlight problems that are limiting the use of AI in four important sectors of Nigeria: health, energy, agriculture and finance and suggested recommendations to solve the AI challenges. The authors discussed Explainable AI (XAI) as a technique for solving challenges like trustworthiness, bias, lack of data, expertise, and confidence in using AI in major sectors. They recommended XAI as a tool to solve the limitations of AI and suggested a human and conditions-based approach to challenges faced in the technology in Nigeria. Explainable AI is a set of processes and methods that allow human users to comprehend and trust the results and output created by machine learning algorithms (IBM, n.d).

Secinaro *et al.* (2021) used a structural literature review to investigate health services management, predictive medicine, patient data and diagnosis, and decision-making. The study revealed that AI can support physicians in making a diagnosis, predicting the spread of diseases, and customizing treatment paths. It also revealed several applications for health services and a stream of research that has not fully been covered and therefore recommends that insights can help researchers and professionals understand and address future research on AI in the healthcare field.

A study by Jagriti (2023) revealed that AI integration in India's healthcare industry is already yielding remarkable results as AI algorithms can analyze massive amounts of data (information) including medical records, diagnostic reports, and genomic information. Similarly, an article by VARTEQ Inc. (2024) explored how AI and digital innovations are expanding the reach of mental healthcare services to previously underserved communities. AI and digital technologies stepped in to bridge the divide in accessing adequate mental healthcare information and services. Through video conferencing, messaging, and virtual sessions, people were able to connect with mental health professionals from the comfort of their homes.

Guo and Li (2018) systematically reviewed and discussed the literature concerning the prospects of medical AI technology, the inequality of healthcare, and the application of computer-assisted or AI medical techniques in rural areas of developing countries. The results showed that medical AI technology improved physicians' efficiency and quality of medical services. It also revealed that health workers could be trained to use the technology where there is physicians' lack thereby making healthcare accessible to people.

The study concludes that inequality between urban and rural health services might be alleviated through the promotion of medical AI technology in rural areas of developing countries.

On their part, Okoye *et al*. (2023) used a qualitative research approach to examine the concept of the digital divide and how the divide could be bridged in Nigeria. Their finding revealed that the digital divide in Nigeria is caused by infrastructural inequalities and deficits and intentional and political phenomena. The study concluded that the threats posed by the digital divide call for an all-inclusive approach that should result in improved economic development. The authors recommended that closing the digital divide is critical to making socio-economic growth in Nigeria more equitable and sustainable.

Okocha and Edafewotu' (2022) study examined the concept of digital divide and ways in which the divide could be bridged in Nigeria using a qualitative research approach and Diffusion of Innovation Theory. The study found out that the digital in Nigeria is caused by poverty and infrastructural inequalities between rural and urban areas. The study further revealed that digital gap in Nigeria is an intentional institutional and political phenomenon and therefore calls for an all-inclusive approach that should result in improved economic development. The researchers recommended that closing the gap in Nigeria is critical to making socioeconomic growth in Nigeria more equitable and sustainable.

Theoretical Underpinning/Framework

The study is anchored on Digital Divide Theory (DDT) and Community-Based Participatory Research (CBPR). DDT originated in the mid-1990s in the United States and postulates that there is a gap between people who do and do not have access to forms of information and communication technology (Van Dijk, n.d.). There is an economic and social gap between the population of a nation and their access to technologies for information and communication. The theory focuses on the gap between those who have access to digital technologies and those who do not. It explores the social, economic, and cultural factors that contribute to disparities in digital access and usage. Relating DDT to this work implies that DDT can help to explain the disparities in technological access and AI-driven health information access amidst socio-economical differences between Nigerian rural and urban communities. The theory explains the reasons why some people have access to ICTs and

others do not or put in another way, why there is gap in access to digital technologies between residents of urban and rural communities.

Community-Based Participatory Research (CBPR) answers the call for more patient-centered, community-driven research approaches to address growing health disparities (Collins *et al*., 2018). It is a collaborative research approach that engages community members, researchers, and other stakeholders as equal partners in the research process. It emphasizes collaboration, empowerment, and culturally sensitive approaches to addressing community needs.

In the context of this research, CBPR could be used to address the growing AI-driven health information disparities. CBPR could be used to involve rural communities in identifying barriers to accessing AI health information and developing strategies to address them. It explains the need for all stakeholders to ethically collaborate, empower, and culturally address disparities in AI health information access for all-inclusive access to be achieved.

Implications of the Disparities in AI-based Health Information Access on Healthcare Outcomes and Patient Empowerment

Disparities in AI-based health information access can have significant implications for healthcare outcomes and patient empowerment. These disparities can stem from various factors such as socioeconomic status, geographical location, digital literacy, and technological infrastructure. The key implications on healthcare outcomes include among others:

- ✓ Widening health inequalities between those in the urban and rural Nigeria. Rural Nigerians with limited access to AI-based health information may experience worse health outcomes compared to those within the urban areas with better access. This can exacerbate existing health disparities as those already disadvantaged are further left behind. While healthcare organizations are investing in AI technologies to enhance efficiency, accuracy, and quality of care as noted by Okoye (2024), the investment is not evenly distributed.
- ✓ Delayed diagnosis and treatment. Limited or lack of access to AI-based tools usually experienced in rural Nigeria can result in delayed diagnosis and treatment when AI technologies can offer early detection of diseases, personalized treatment plans, and

continuous health monitoring, which are crucial for managing chronic conditions and improving outcomes.

- ✓ Inconsistent quality of care. Access to AI-based health information can lead to variations in the quality of care received. Those with better access may benefit from more accurate diagnosis, advanced treatment options, and better overall care management.

The key implications on patient empowerment include among others:

- ✓ Informed decision-making. AI can provide patients with comprehensive and personalized health information, enabling them to make informed decisions about their health. AI systems have the potentials to influence medical decision-making, and there is need to ensure that patients are adequately informed about the role of AI in their care (Stephen *et al*., 2024). Disparities in access mean that not all patients can benefit from this level of empowerment, leading to unequal participation in healthcare decision-making. Khan (2023) avows that patient empowerment is deeply rooted in the ability to make informed decisions.
- ✓ Self-management and preventive care. Khan (2023) writes that digital health revolution extends mere access but also empower patients to manage permissions regarding their health information. Patients with access to AI-health tools can better manage their health conditions and engage in preventive care. This includes using AI-powered apps for monitoring vital signs, managing medication, and receiving tailored health information or advice. Those without access miss out on these benefits as technology holds promise for the future of healthcare (NHS Confederation, 2023).
- ✓ Health literacy. AI can enhance health literacy by providing easy-to-understand information and educational resources. Disparities in access can result in unequal improvements in health literacy, affecting patients' ability to navigate the healthcare system and understand their health conditions.

The disparities can also have broader social implications thus:

- ✓ Economic impact. Poor health outcomes due to lack of access to AI-based health information can have broader economic implications, including increased

healthcare costs and lost productivity. This can further entrench poverty and reduce economic mobility.

- ✓ Equity and justice. Addressing disparities in AI-based health information access is a matter of social justice. Ensuring equitable access is critical to providing fair and just healthcare for all, regardless of socioeconomic or geographical differences.
- ✓ Policy and regulations. These disparities highlight the need for robust policies and regulations to ensure equitable access to AI health technologies. This includes investing in digital infrastructure, providing training and education, and addressing systemic barriers to access.

Addressing these disparities is sure to ensure a more equitable healthcare system where all individuals have the opportunity to benefit from advances in AI technology, leading to better health outcomes and empowered patients.

Strategies to Addressing the Disparities and Promoting Equitable Access to AI-driven Health Information Dissemination in Rural Nigeria

The Technology and Innovation Report 2021 urges all developing nations to prepare for a period of deep and rapid technological change that will profoundly affect markets and societies (UNCTAD, 2021). This calls for the need to close the disparities caused by the digital divide that impedes access to AI health information in Nigeria. Mukhisa Kituyi cited in UNCTAD (2021) avows that low- and middle-income developing countries and the least developing countries cannot afford to miss the new wave of rapid technological change.

Nigeria as one of the least developing countries has no option but to heed this advice. Addressing the divide and disparities in accessing AI health information for rural Nigeria requires a multi-faceted approach that considers technological, infrastructural, educational, and socio-economic factors. Suggested strategies for bridging the divide and addressing the disparities include among others:

- Improved Infrastructure. Inadequate infrastructure as pointed out by Okoye *et al*. (2023) and Ravi *et al*. (2024) is a major lack in rural Nigeria. To mitigate it, the government should partner with technological companies to expand broadband internet access in rural communities that will ensure reliable and high-speed internet connections and invariably enable access to online health resources and AI-powered tools.

- Mobile Health Solutions. Development of mobile applications or SMS-based services that would deliver AI-driven health information and reminders to mobile devices considering that mobile phones are more prevalent than desktop computers in many rural Nigeria would help address the divide and disparities.
- Community Health Worker Programmes. To bridge the divide and address the resultant disparities, the implementation of training programmes for community health workers in rural Nigeria to effectively utilize AI-powered health tools and disseminate health information as suggested by Guo and Li (2018) is a necessity.
- Telemedicine and Telehealth Services. Otighi ALCMC (2024) summarizes telemedicine as the use of technology to deliver healthcare to individuals remotely. Telemedicine is an example of AI technology which Jagriti (2023) submits has the potential to revolutionize healthcare accessibility in India and empower millions to receive timely and affordable healthcare services. AI-driven diagnostic tools and virtual assistants could be integrated into telemedicine services to make healthcare information more accessible to rural Nigerians. A virtual assistant is a self-employed worker who specializes in offering administrative services to clients from a remote location using a home office (Kenton, 2023).
- Localized AI Solution. AI algorithms tailored to address specific health needs and challenges of rural communities could be developed by AI experts as a way of bridging the divide and disparities since AI algorithms have been acknowledged to analyze vast amounts of data/information (Okoye, 2024). Innovative apps that help medical professionals are being developed in Kenya to support the educational system (Mhlongo, 2023). Government can allocate resources and funding for such initiative to be developed and implemented in rural Nigeria.
- Collaboration with Local Institutions. Partnerships with local healthcare providers, community centers, and educational institutions to deploy AI health solutions and provide training and support for their use will go a long way towards bridging the divide and disparities in rural Nigeria. Engaging with communities to understand their needs and developing culturally relevant AI tools can improve acceptance and use.

- Language and Literacy Considerations. Ensuring that AI health information is available in languages commonly spoken in rural communities and presented in formats that are accessible to rural Nigerians with varying levels of literacy is a plus to bridge the divide and disparities.
- Public Awareness Campaigns. The government and other stakeholders should launch targeted campaigns and create ICTs Task Force as adopted by United Nations Hanna (2021) in rural Nigeria to raise awareness about the benefits of AI-driven health information and how it can improve health outcomes in rural areas.
- Data Privacy and Security. Data privacy and security measures should be implemented to protect the sensitive health information of rural residents when using AI-powered health tools and platforms.

In summary, it is possible to effectively address disparities in accessing AI health information by implementing the aforementioned factors in other to improve healthcare outcomes and empower the underserved populations.

Discussion

The findings show that there are multiple barriers preventing rural Nigeria from accessing digital technology and that most of the barriers are man-made. Government and other related bodies are responsible for the distribution of network connectivity and they intentionally distribute and connect urban areas more than rural areas. This agrees with Burrell (2018) thinking that poor network connectivity in rural areas is a matter of exclusion shaped by geography, remoteness, and population density. Rural communities can always be listed in the scheme of things if those in authority care about the general good.

The finding that poverty is a barrier to accessing digital technology is in line with Okocha and Edafewotu's (2022) study that the digital divide in Nigeria is caused by poverty and infrastructural inequalities between rural and urban areas. Finding on lack of trained medical personnel in rural Nigeria can be solved by training health workers to use AI-powered health technology Guo and Li (2018). Government and concerned wealthy individuals should alleviate poverty and provide fund for the training.

Similarly, language and cultural barriers can be surmounted by ensuring that AI health information is available in languages commonly spoken in rural communities. It is very

hard to pull people out of obnoxious cultures and tradition if they are not literate enough to see reasons for change. Also, Mohammed and Shehu (2023) recommendation that Explainable AI (XAI) should be used as a technique for solving challenges like trustworthiness, bias, lack of data, expertise, and confidence in using AI in major sectors is upheld..

It needs Government's political and moral will to make implementable policies to digitally connect geographically disadvantaged Nigerian rural communities as disclosed by Ravi *et al.* (2024) that existing infrastructure and resources are inadequately distributed with most services concentrated in urban tertiary health centers.

With reference to the findings about the implication of the disparities in AI-based health information access, individuals, government and other stakeholders should do the needful and make sure the rural residents are carried along in digital literacy access, healthcare outcomes and empowerment. Digital health literacy will help them to make informed decisions about their health.

Findings on the suggested strategies to bridging the divide and addressing the disparities can be surmounted using technology access as it needs technology access to address technology lack since almost all the suggested strategies are technology-based. The Nigerian government, policymakers, technology companies, civil society organizations, NGOs, the media, and academia should all collaborate in the effort to address digital divide that causes lack of access to AI-driven health information particularly in rural Nigeria. Expanding internet access, especially in rural and underserved Nigeria, and ensuring affordable connectivity is crucial.

Conclusion

Digital divide has been discussed as a global issue mostly observed in the developing world and rural Nigeria in particular, causing disparities in accessing AI-driven health information in rural Nigeria. The paper therefore explored multifaceted barriers preventing Nigerian rural residents from accessing AI-based health information and examined the impact of these disparities on healthcare outcomes and patient empowerment. Different strategies to bridging the divide and addressing the disparities were also discussed to make AI health information an all-inclusive one.

There is therefore urgent need for the Nigerian government to take appropriate measures to bridge the digital divide to give rural communities access to AI health information in particular. Inequitable access to AI healthcare information implies a lack of opportunities for rural Nigerians to reach their fullest health potential. AI for health is noted to have great potential (Guverich *et al*, 2022). The Nigerian government is urged to persevere in its bid to fully integrate the services of AI, especially in health information provision, and make it an all-inclusive venture.

Making AI an all-inclusive venture entails that the Nigerian government and other concerned bodies should work towards addressing the disparities caused by the digital divide which poses a challenge with AI health information access, especially as MyProject (2024) states that AI is the trending technology worldwide whose potential is on a continual growth pathway as the days go by but regrets that little about AI is applied in developing economies.

Addressing the divide and the disparities is sure to improve patient outcomes and thus help in achieving SDG health goals. It is therefore recommended that the Nigerian government should establish an affirmative environment through meaningful and inclusive consultations with all key stakeholders to effectively address the divide and disparities using the suggested strategies in order to foster a more digitally inclusive and just society, particularly for better AI-powered health information access. There should be ongoing digital trainings especially in Nigerian rural communities. The training should be without charge because of the high rate of poverty in Nigeria.

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