ISSN: 2352-975X مجلـة البـاحث للـدراسات الأكـاديـمـيـة EISSN: 2588-2368
ELBAHITH for Academic Studies
Volume: 13 /N°: 02 /Year: 2026 /pp: 256 – 271

The Role of Artificial Intelligence in Advancing Health Justice - Sub- Saharan Africa as a Case Study -

Received date: 01/04/2026 **Accepted date: 25/05/2026**

MAALEM Oum El Banine [*]
University of Batna1
Laboratory: Security and Development in the Mediterranean Region
oumelbanine.maalem@univ-batna.dz

Abstract:

Artificial intelligence technologies can become a fundamental and complementary pillar of health policies for most sub-Saharan African countries, due to their ability to provide comprehensive care, manage complex cases from start to finish, provide complex treatment recommendations, and adapt to new clinical scenarios without prior instructions. The Covid-19 pandemic has revealed that a region lacks 80% of health facilities and faces unequal access to health care, especially in rural areas. Despite the challenges facing the health field, the problem of the study lies in understanding the role of artificial intelligence in achieving health justice in sub-Saharan Africa. The study concluded that sub-Saharan African countries have adopted national strategies for artificial intelligence and that regulatory frameworks are essential to ensure the successful application of artificial intelligence and achieve health justice across various health care environments.

Keywords: *artificial intelligence; health justice, sub-Saharan Africa*

Introduction:

Health equity has gained prominence in recent years, particularly in the aftermath of rapidly spreading epidemics and viruses. The COVID-19 pandemic revealed significant weaknesses in healthcare systems across sub-Saharan Africa, a region marked by high disease prevalence, insufficient healthcare infrastructure, and restricted access to quality medical services, especially in rural communities. In response, sub-Saharan African countries have begun implementing strategic policies that integrate artificial intelligence (AI), a transformative element in healthcare systems. These policies seek to strengthen the regional health sector by utilizing AI algorithms for precise diagnosis and effective disease forecasting. Consequently, this approach facilitates the optimization of resource allocation to address

[*]***- Corresponding Author****.*

health challenges and expand access to high-quality healthcare services throughout sub-Saharan Africa.

- The importance of the topic: *The importance of this topic stems from:*

- The implementation of artificial intelligence tools is considered essential for strengthening health systems.

- The ability of artificial intelligence technologies to improve efficiency, fairness and transparency in financing health services.

- Sub-Saharan African countries are prioritizing digital transformation and the adoption of artificial intelligence tools to strengthen health systems.

- Research objectives: *The study highlights the role of artificial intelligence tools in enabling sub-Saharan African countries to achieve health equity now and in the future.*

- The problem of research :*Based on the above, the following problem can be raised: What is the role of artificial intelligence in promoting health equity in sub-Saharan Africa?*

- Research methodology: *The study addressed a descriptive analytical methodology based on the descriptive analytical approach, which is based on determining the reality of health justice in the sub-Saharan African region, and employing artificial intelligence tools to improve health care, while evaluating the opportunities and most important challenges that stand in its way forward.*

- General plan of the research: *The study is divided into four chapters:*

- Chapter I: the conceptual foundation of the study.

- Chapter II: The reality of health justice in sub-Saharan Africa.

- Chapter III: Employing Artificial Intelligence to Achieve Health Equity in Sub-Saharan Africa.

- Chapter IV: Opportunities and Challenges of Promoting Health Equity with AI Technologies in Sub-Saharan Africa.

Chapter I: the conceptual foundation of the study:

The term artificial intelligence was first mentioned in 1956 by John McCarthy, who organized a workshop at Dartmouth College that brought together researchers interested in neural networks. Although this workshop did not lead to new innovations, it brought together the founders of artificial intelligence and thus contributed to laying the foundation for future research related to it(1).

For the purpose of defining artificial intelligence, we will discuss its definition in language and terminology:

1- Definition of artificial intelligence language:

Intelligence in language: Intelligence: sharpness of heart. Intelligence: the speed of intelligence. Al-Layth said: Intelligence comes from your saying: a smart heart. If it has a quick wit and is intelligent with a kasra, then it is intelligent. It is said: He is smart, he is smart, and he is smart, he is smart. It is said: His heart is intelligent when he is alive after his country, so he is intelligent for the sake of action. Intelligence, according to the (Webster) dictionary, is: the ability to understand new and changing circumstances or conditions; that is, it is the ability to perceive, understand and learn new cases or conditions[(2)].

Definition of artificial in language: made: He made: He made it, He made it, so it is a work and a work: His work. God Almighty said: (And you see the mountains, thinking them motionless, while they will pass as the passing of clouds. [It is] the work of Allāh, who perfected all things. Indeed, He is Aware of that which you do) (An-Naml: 88), and artificiality: an act of craftsmanship. So-and-so made a ring if he asked a man to make a ring for him, and he made something: He called for its making, and the artificial is: "what was made unnatural[(3)].

2- Definition of artificial intelligence technically:

Artificial intelligence is defined as: "A poorly defined term, partly because its meaning has changed over time. Artificial intelligence refers to efforts to build computers and machines capable of performing actions that would be expected to require human intelligence. However, the more scientists create systems capable of performing tasks, the more it is thought to be the preserve of humans. Thus, artificial intelligence has become known for more complex tasks. Once something succeeds, we stop calling it artificial intelligence and start calling it degrees[(4)]."

Artificial intelligence is also known as: "It is like teaching a machine to deduce for itself, and realize what it should and should not do. Encryption or coding here is not explicit, as it allows the machine a certain amount of maneuverability. The science of artificial intelligence aims to develop systems that achieve a level of intelligence similar to or better than human intelligence. The goal is to place human knowledge inside the computer within what is known as knowledge

bases." Then, through programmed tools, the computer can search these rules, compare and analyze, to extract and deduce the best answers and solutions to various problems. This is similar to what a person does when he tries to solve new problems based on his previous experiences and experiments, and through his expectations of possible results, and through his skills in deduction and comparison between the best available solutions(5).''

3- <u>Definition of health justice</u>:

Recurrence of justice had decreased due to the fading of the pandemic and its effects. Many definitions of artificial intelligence, perhaps the most important of which are:

The term justice appeared continuously in the meetings and decisions of the World Health Assembly in the period between the years (1948-2023), which is considered the highest body entrusted with discussing and making global health decisions in the World Health Organization, but what is striking is the repetition of that term in those meetings when epidemics spread such as Swine flu virus (H1N1) in 2009, to highlight timed risk factors in developing countries Such as the lack of medical resources, which increases the severity of the side effects of the pandemic, but by 2010 the pace of repeating justice for the fading of the pandemic and its effects decreased(6).

For the purpose of defining health justice, we will discuss its definition in language and terminology:

A- Definition of health justice language: *Justice in language: complete neutrality and impartiality, and is based on giving everyone their due and not assaulting others.*

Justice of distribution: (economy) The state's distribution of rights and duties among individuals according to their competencies within the limits of the public interest(7).

Social justice (economy): is an economic system that works to eliminate large economic differences between classes of society.

A natural state in which the body's actions take place in a natural course. (Medical terms)(8).

B- Definition of health justice terminologically: *Health equity is defined as: "the state in which everyone has a fair and equitable opportunity to achieve the highest standard of health, and achieving this requires focused and sustained societal efforts to address historical and contemporary injustices, overcome economic, social, and other*

obstacles to health and health care, and eliminate Preventable health disparities[9]."

Health equity is also defined as: "the absence of systemic disparities in health that can be avoided through prevention and care, the equitable distribution of the burden of health care costs, according to individuals' ability to pay, and the fair and timely response to the personal needs, rights, and expectations of those seeking health care through dignity-based interaction with the provider and the health system[10]."

Health equity can be defined as: "When all people have broad access to health, and no one is fundamentally deprived of achieving these things because of social status or any other condition created by social conditions[11]."

4- <u>Basic principles for achieving health justice</u>:

The basic principles of health justice are as follows[12]:

- Improving the conditions of daily life, that is, the conditions in which people are born, grow, live, work, and age.

- Confronting the phenomenon of injustice in the distribution of influence, money, and resources, i.e., the structural driving forces of these daily living conditions at the local, national, and global levels.

- Universal health coverage: This means that every person can obtain all the health services he needs of high and sufficient quality, so that these services have a positive impact on the person's health, and without the latter being exposed to financial distress[13].

- Adopting the principles of health equity language can help health policy practitioners avoid inhumane and exclusionary language (km), as well as inappropriate terminology that perpetuates racist regimes and leads to inequalities in population health[14].

5- <u>Artificial intelligence applications in healthcare</u>:

There are different opinions about the most useful applications in healthcare, and perhaps the most important areas, according to a 2018 Forbes report, are: [15]

***A- Precision medicine:** It has the potential to design healthcare interventions tailored to individuals or patient groups based on their disease profile, diagnostic information, prognosis, or response to treatment. Precision medicine is divided into three types of clinical fields: complex algorithms, healthcare applications, and omics-based testing.*

B- Medical Visualization: *Interpreting data that appears in the form of an image or video is a difficult task. Experts in this field have to train for many years to achieve the ability to distinguish medical phenomena. With the ever-increasing demand and the significant shortage of experts in this field, a new approach is needed. Artificial intelligence is a tool that will be used to fill this demand gap. Medical visualization is divided into machine vision for diagnosis and surgery Computer vision for diagnosis and surgery, deep learning and medical image recognition....*

C- Smart Personal Health Records: *Personal health records have historically been physician-oriented and often lack patient-related functions. However, to promote self-management and improve patient outcomes, a patient-specific personal health record should be implemented. The goal of all this is to allow patients a great deal of freedom to manage their cases, while freeing up time for physicians to perform more important and urgent tasks*[16].

Research into the application of AI in healthcare continues at an accelerated pace, demonstrating potential use cases across the healthcare sector (physical and mental health), including drug discovery and virtual clinical consultations, disease diagnosis and prediction, drug administration, and health monitoring[17].

Chapter II: The reality of health justice in sub-Saharan Africa:

To fully understand the magnitude of health care challenges in sub-Saharan Africa, the historical context must be taken into account. Colonialism left a legacy of economic and political instability that continues to affect the region's infrastructure and health care systems. After independence, many countries in sub-Saharan Africa struggled to establish the stable governance needed to develop health care systems and train local staff. Many rural areas lack even basic medical facilities, and while they do exist, they are often poorly equipped and understaffed. According to the World Health Organization, sub-Saharan Africa has only 1.3 health workers per 1,000 people, far below the WHO's recommended minimum of 4.5 for basic health services. The shortage of healthcare professionals is another significant obstacle[18].

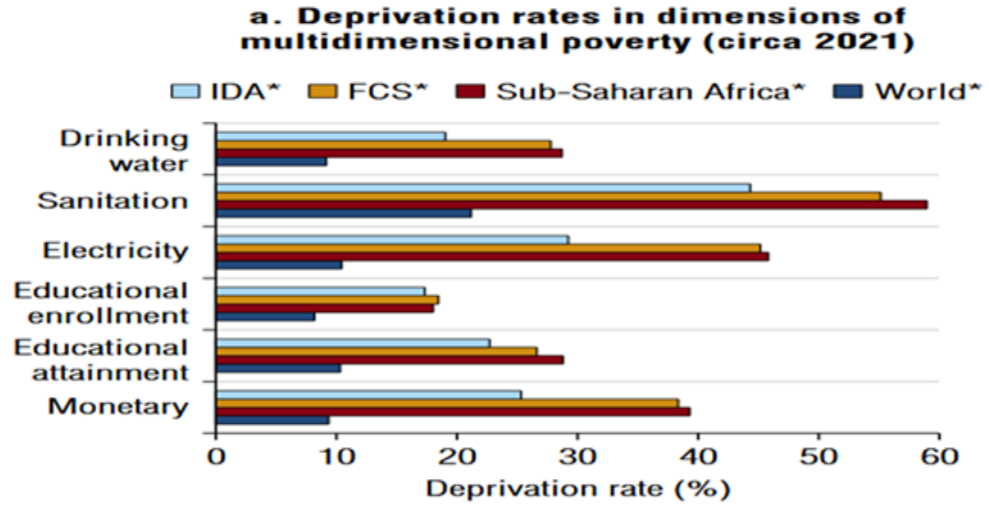
Infectious diseases are another major challenge, and sub-Saharan Africa bears a disproportionate burden of conditions such as HIV (AIDS, malaria, and tuberculosis). According to UNAIDS, the region accounted for 59% of all people living with HIV worldwide in 2020,

and also accounts for 94% of global malaria cases and deaths These diseases place enormous pressure on healthcare systems that are already under-resourced and under-funded, leading to a global maternal mortality rate of 533 deaths per 100 live births. According to UNICEF, the mortality rate of children under five has halved globally, due to malnutrition at 74.77%[(19)]. Lack of access to clean water and poor sanitation make it difficult for children to survive. The recent Covid-19 pandemic has revealed to us that an area where 80% of health facilities lack access to the simplest and most important medicines, such as oxygen[(20)].

Financial barriers prevent poor groups in sub-Saharan Africa from accessing health care, due to common direct payments, which place a heavy financial burden on families. In this context, the World Bank indicates that more than 40% of health care financing in the region comes from direct payments, and for many families, the cost of health care can push them into poverty, creating a vicious cycle of poor health and economic hardship Insufficient access to education, electricity, or basic services such as safe drinking water and sanitation (as shown in Figure No. 1). We find that the percentage of education in the poorest countries does not exceed 20% of those with education[(21)].

The enrolment rate in education is estimated at 18% compared to the rest of the world. In addition, about half of the population in sub-Saharan Africa and the European Union countries lack access to electricity (about 48.5% in sub-Saharan Africa), sanitation services, and drinking water (estimated at 59% for services and 28.7% for potable water in sub-Saharan Africa compared to the rest of the world). Thus, more than half of the population of sub-Saharan Africa in 2024 suffers from multidimensional poverty, depriving them of the ability to realize their full potential, highlighting the ongoing development challenges[(22)].

Figure (1)[23]: Deprivation rates in the dimensions of multidimensional poverty for the year 2021



Sources: Panel a: World Bank calculations using data from the G calculations using data from Doan et al. 2023.

Chapter III: Employing Artificial Intelligence to Achieve Health Equity in Sub-Saharan Africa:

Artificial intelligence (AI) has transformed healthcare by enhancing the quality of patient care. AI technologies are applied in diverse areas, such as patient monitoring, disease spread prediction, peak time estimation, medical imaging data classification, healthcare management, and increasing healthcare system capacity. Additionally, AI has been instrumental in drug and vaccine development, particularly in identifying small compounds and peptides for COVID-19 vaccine research. Consequently, AI holds significant potential to advance vaccination initiatives by strengthening predictive analytics and optimizing operational processes[24].

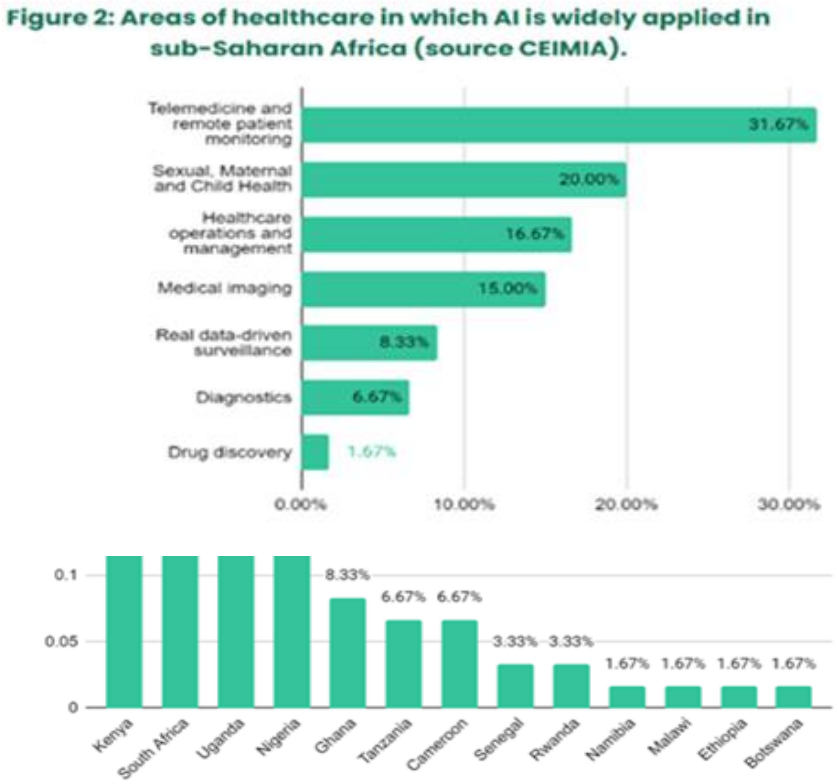
Artificial intelligence represents a potential paradigm shift in enhancing health security. It may become essential for development in African countries, particularly in bridging the digital divide between the global North and South. Africa's predominantly young population presents a significant opportunity to leverage these technologies to address critical challenges across the continent, provided that their advantages are effectively communicated to national leaders and

policymakers. Many African countries experience resource constraints when addressing urgent health issues, including endemic and non-communicable diseases. AI tools can facilitate optimal resource allocation in these contexts by predicting risks and informing surveillance priorities(25).

The health sector in sub-Saharan Africa suffers from several critical problems, including a lack of health facilities (hospitals, clinics, and medical equipment), limited access to high-quality health care, a shortage of medical personnel, and high rates of disease. Access to health services, especially in rural areas, is restricted due to poor infrastructure, transportation, and health facilities. These challenges have been exacerbated by the COVID-19 pandemic, highlighting the need for innovative approaches to strengthening health systems in Africa. In an era characterized by technological advancement and emerging technologies, artificial intelligence provides unprecedented opportunities to bring about a qualitative shift in health systems in sub-Saharan Africa(26).

Sub-saharan Africa has adopted artificial intelligence initiatives in various fields of health care (as shown in Figure No. 2), through which we showed an approximate rate of adoption of artificial intelligence solutions in the fields of: telemedicine by 31.67%, sexual and reproductive health (20%), health care management (16.67%), medical imaging (15%), data monitoring (8.33%), diagnosis (6.67%), and drug discovery (%1.67) Based on these results, we find that Kenya, South Africa, Uganda, Nigeria and Ghana (as shown in Figure 3) are the countries most active in developing AI solutions in healthcare in sub-Saharan Africa. In this context, we find that private companies accounted for 66.7% of the increase in AI solutions applied to healthcare (as shown in Chart 4). For example, Kenya integrates AI platforms such as "sophiebot.ai" into its services to provide affordable, accessible psychological support to everyone, and Uganda is also using the AI-powered CTI Africa platform to improve patient tracking and care, making healthcare more responsive and efficient(27).

***Figure 2**: Areas of healthcare in which AI widely applied in sub-Saharan*

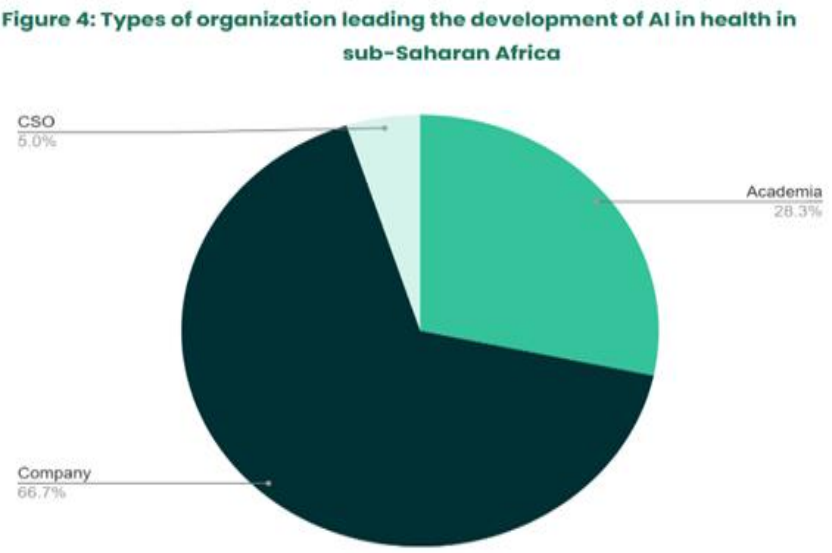


***Source**: Artificial Intelligence in Sub-Saharan Africa - Healthcare Report*[28]

Nigeria uses Helium Health to predict patient outcomes and design personalized treatment plans, improving preventive care and treatment efficiency. AI-powered Viebeg Medical has provided demand forecasting for medical supplies, ensuring efficient restocking and reducing shortages. Rwandan company Bablyl has also introduced a triage system that improves patient assessment efficiency and the quality of clinical questions, while providing standardized feedback for physicians. All of this is specifically designed to fit Rwanda's unique epidemiological, linguistic, and cultural situation. In addition, the Health-E-Net network processes data in real time, with patient data being efficiently collected and disaggregated via smartphones or

chatbots. South Africa employs the NetCare platform to simplify sample collection and improve operational efficiency in its hospital network[29], followed by the Academy with 28.3%. Finally, civil society organizations at 5.0%[30].

***Figure 4**: types of organization leading the development of Ai health Sub- Saharan Africa*



Despite the rate of adoption of AI in health in sub-Saharan Africa, if applied responsibly, it can contribute to accelerating the pace of health sector investments in the region, by enhancing efficiency, equity, and transparency in financing health services. This was reinforced by the High-Level Forum on Universal Health Coverage held in Tokyo on December 6, 2025. In order to advance the health sector to include all, the forum focused on sustainable health financing. A sense of national ownership and strengthening cooperation between leaders in the fields of health and finance, and thus countries, including Kenya, Ethiopia, Rwanda, and Nigeria, launched national health charters to build equitable and resilient systems[31].

Chapter IV: Opportunities and Challenges of Promoting Health Equity with AI Technologies in Sub-Saharan Africa:

- Opportunities: *Artificial intelligence presents significant opportunities to enhance healthcare delivery in sub-Saharan Africa by[32]:*

- Enabling the shift from reactive responses to proactive and preventive strategies in the event of a sustainable environment that ensures equitable access to health services.

- These technologies can accelerate the development of affordable, high-quality, and accessible healthcare, while addressing the resource-limited environments prevalent in many sub-Saharan African countries.

- AI tools are likely to strategically help balance and maximize the effective use of resources to address health issues by predicting risks and using outputs to highlight monitoring priorities.

- It can enhance communication and facilitate the flow of health information, enable AI technologies to contribute to early disease detection, improve diagnosis, manage healthcare more efficiently, enhance clinical decision-making, and increase access to high-quality healthcare services.

- The use of artificial intelligence allows the development of policies specifically designed to address health disparities based on evidence, and countries such as Kenya, South Africa, Uganda, Nigeria and Ghana are at the forefront of this field, driven by strong ecosystems supported by international funding and innovative local institutions[33].

- It has played a pivotal role in drug and vaccine development, and in identifying small compounds and peptides for COVID–19 vaccine development, so AI has the potential to revolutionize vaccination efforts by enhancing predictive capabilities and improving operational efficiency.

- Challenges:

Although artificial intelligence has been adopted in healthcare within sub-Saharan Africa, significant structural obstacles remain. These challenges can be categorized as follows[34]:

- Infrastructure disparity: Reliable access to electricity and the internet is essential for AI implementation. Only 27% of healthcare facilities in rural sub-Saharan Africa have stable access to electricity. Bridging these gaps requires significant investments in digital infrastructure, particularly in underserved areas.

- Ethical concerns regarding data privacy and fairness:

- Data privacy and security issues remain a major challenge, as unregulated data collection puts sensitive patient information at risk, undermining public confidence in AI technologies.

- Algorithmic biases caused by unrepresentative datasets may perpetuate health care inequalities, disproportionately affecting vulnerable populations. As a result, health policies based on them may neglect the needs of rural and disadvantaged communities, widening the health care gap between different population groups[(35)].

Social and economic obstacles:

- Most sub-Saharan African countries allocate only about 2.3% of GDP, well below the 5% target for digital health initiatives. This shortage leads to gaps in workforce training and experience development.

- The absence of organized training programs in the field of artificial intelligence leads to a shortage of qualified personnel capable of applying artificial intelligence solutions effectively.

- Many sub-Saharan African countries lack comprehensive policies and regulatory frameworks to integrate AI into healthcare. In the absence of clear guidelines, adoption of AI technologies remains fragmented and inconsistent. The experiences of countries such as Rwanda, Kenya, and Nigeria, which have adopted national strategies for artificial intelligence, highlight the importance of having organized frameworks to ensure the successful application of these technologies.

Conclusion:

Despite the adoption of artificial intelligence technologies in health care by most sub-Saharan African countries, significant barriers continue to impede the attainment of high-quality, equitable health care. Artificial intelligence has the potential to transform health systems if investments are directed responsibly to promote fairness and equality in health care, thereby substantially advancing health equity for the populations of sub-Saharan Africa.

Upon examining the issues discussed in this paper, we present the following ***conclusions****:*

1- Colonialism in sub-Saharan Africa resulted in enduring economic and political instability, which continues to manifest in infrastructure, healthcare systems, and the development of local human resources.

2- Financial barriers limit access to health care for economically disadvantaged populations in sub-Saharan Africa.

3- The health sector in sub-Saharan Africa encounters substantial challenges, including inadequate health facilities such as hospitals, clinics, and medical equipment, as well as limited access to high-quality health care.

4- Kenya, South Africa, Uganda, Nigeria, and Ghana are prominent in developing artificial intelligence solutions for healthcare in sub-Saharan Africa.

- Recommendations:

1- Addressing the legacy of colonialism in sub-Saharan Africa requires comprehensive economic and political restructuring to mitigate inequalities in healthcare costs.

2- In sub-Saharan Africa, the development of efficient health systems should prioritize the responsible and ethical implementation of artificial intelligence technologies, ensuring the protection of patients' personal data privacy.

3- Sub-Saharan African countries must develop comprehensive policies and regulatory frameworks for integrating AI into healthcare to ensure its successful implementation.

4- It is essential for leading sub-Saharan African countries to make substantial investments in digital infrastructure, especially in underserved regions, to promote equity and transparency.

5- Structured training programs in artificial intelligence applications should be implemented to enhance the skills of qualified personnel and address algorithmic biases that contribute to healthcare inequity.

Referrals and References:

(1)- Awad Hussein Yassin Al-Obaidi, The Concept of Artificial Intelligence, the site was browsed on: 1/10/2025, at: 20:59, p. 1. https://sjc.iq/view.69927/

(2)- Awad Hussein Yassin Al-Obaidi, op. cit, p. 1.

(3)- Awad Hussein Yassin Al-Obaidi, op. cit, p. 1.

(4)- Franke Ulrike, Artificial Intelligence diplomacy: Artificial Intelligence governance as a new European Union external policy too, Luxembourg: Policy Department for Economic, 2021, p.9.

(5)- Hana Rizk Muhammad, Artificial Intelligence Systems and the Future of Education, Journal of Studies in University Education, Issue 52, 11/30/2021, p. 373- 374.

(6)- Heba Mohi, Governance Challenges: Health Justice.. How do you confront potential global epidemics? The site was browsed on: 1/26/2026, p. 1. https://2u.pw/XitqR
(7)- The Comprehensive Dictionary of Meanings, Definition and Meaning of Justice, viewed on: 1/26/2026, p. 1. https://2u.pw/Qau2A
(8)- Arabic-Arabic dictionary, definition and meaning of health, the site was browsed on: 1/26/2026, p. 1. https://2u.pw/PEeGiq
(9)- William bill Jenkins, "About Health Equity", The site was accessed on: 26/1/2026, p. 1. https://2u.pw/KjEM7
(10)- Mreizq Adman, Muhammad Bouhadida, Muhammad Adman, Health Justice: Between Theorizing and the Injustice of Reality, Al-Asala Journal of Studies and Research, Volume 01, No 2, 2019, p. 59.
(11)- William bill Jenkins, op.cit, p.1.
(12)- Merizak Adman, Mohamed Bouhadida, Mohamed Adman, op.cit, p. 60.
(13)- Mohamed Khairi, The Importance of Public-Private Partnerships in Achieving Universal Health Coverage in Algeria, New Economy Journal, Volume 13, No 2, 2022, p. 543.
(14)- Kamaria Kaalund, Jay A. Pearson, Andrea Thoumi, Naming and Framing: Six Principles for Embedding Health Equity Language in Policy Research, Writing, and Practice, The Milbank Quarterly Journal, volume 103, No 1, 2025, p. 130.
(15)- Adam Bohr, Kaveh Memarzadeh, The rise of artificial intelligence in healthcare applications, London: Elsevier, 2020, pp.28- 29.
(16)- Adam Bohr, Kaveh Memarzadeh, op. cit,p.29.
(17)- Junaid Bajwa and Others, Artificial intelligence in healthcare: transforming the practice of medicine, Future Healthcare Journal, Vol 8, No 2, 2021, P. 190.
(18)- Ray R Harris, The Healthcare Crisis in Sub-Saharan Africa, the site is browsed on: 7/3/2026,p.1. https://2u.pw/ePTiMQ
(19)- Edema Odeworitse Meshach, Determinants of Health Inequity in Sub-Saharan Africa Health Economics, International Journal of Research and Innovation in Social Science, volume 9, Issue 3, 2025, p. 9.
(20)- Edema Odeworitse Meshach,op.cit,p.1.
(21)- World Bank Group, Poverty, Prosperit and Plan Report 2024, Washington: World Bank Publications, 2024, p.34.
(22)- World Bank Group, Poverty, Prosperit and Plan Report 2024, op.cit,p.34.
(23)- World Bank Group, Major Development Challenges 2024 in Nine Charts: How the world is off track to reduce poverty, the site was browsed on: 9/2/2026, p.1. https://2u.pw/tyVbes
(24)- Toluwase Oluwajomiloju Ogundip and others, Artificial intelligence in vaccine coverage in Africa: predictive analytics and innovations for immunization equity, Springer Nature, volume 2, No 2, 2025, p.2.
(25)- Claire J. Standley and Others, Artificial intelligence for health security in Africa: Benefits, risks and opportunities, Elsevier, volume 53, December 2025, p.5.
(25)- Claire J. Standley and Others, Op. cit, p.6.
(26)- Thomas Hervé Mboa Nkoudou, State of AI in Healthcare in Sub-Saharan Africa Report, Canda: Ceimia, 2024, p. 13.

(27)- Thomas Hervé Mboa Nkoudou, op. cit, p.14.
(28)- Ai in Africa, Artificial Intelligence in Sub-Saharan Africa - Healthcare Report, the site was browsed on: 24/2/ 2026, p.13. https://2u.pw/0L6JtD
(29)- African Leadership University, Artificial Intelligence in Sub-Saharan Africa: Overall Report, Kigali: SAND Technologies, 2025,pp.24-26.
(30)- Thomas Hervé Mboa Nkoudou, op. cit,p.14.
(31)- World Bank Group, Progress towards the goal of covering 1.5 billion people in health care with countries adopting national health charters, The site was browsed on: 20/3/ 2026, P.1. https://2u.pw/f7797n
(32)- Melissa Omino and others, The State of AI in Africa Report 2025, Nairobi: CIPIT, 2025,pp. 35- 36.
(33)- Melissa Omino and others, op. cit, pp.35- 36.
(34)- Marko Kimi Milic, The Role of Artificial Intelligence in Strengthening Healthcare Delivery in Sub-Saharan Africa: Challenges and Opportunities, Zenodo, January 2025,p.17.
(35)- Muslim A. Alaran and Others, Challenges and opportunities of artificial intelligence in African health space, Digital Health, Volume 11, 21/1/ 2025, p.4.