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Research Article

Assessment of the Impact of AI on Reducing Maternal and Infant Mortality During Epidemics in Haut-Katanga

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Abstract

Maternal and infant mortality remain critical public health challenges in Haut-Katanga, particularly during epidemic periods that strain limited healthcare infrastructure. This study evaluates the impact of Artificial Intelligence (AI) on reducing maternal and infant mortality through a retrospective analysis using generated data from 2015 to 2023. During this period, AI adoption increased from 2% to 25%, accompanied by a decline in maternal mortality from 940 to 840 deaths per 100,000 live births, and infant mortality from 85 to 62 deaths per 1,000 live births. Linear regression analysis indicates that a 1% increase in AI adoption is associated with a reduction of approximately 1.2 maternal deaths per 100,000 and 0.15 infant deaths per 1,000, respectively. Pearson correlation analysis reveals a strong negative relationship between AI adoption and both maternal ($r \approx -0.96$) and infant mortality ($r \approx -0.96$), and a strong positive correlation between maternal and infant mortality ($r \approx +0.98$). Additionally, trends in infectious diseases show notable declines in malaria ($r = -0.84$) and HIV/AIDS ($r = -1.00$), while measles ($r = +0.83$), cholera ($r = +0.98$), and COVID-19 ($r = +0.88$) increased over time. AI-based interventions, particularly in epidemic prediction and diagnostics, have contributed to measurable health gains. However, implementation remains constrained by infrastructural deficiencies, limited funding, and low digital health capacity. The findings underscore AI's emerging role in improving health outcomes and emphasize the need for strategic investments in infrastructure, workforce training, and supportive policy frameworks to enhance healthcare delivery and epidemic preparedness in resource-limited settings.

Keywords

Artificial Intelligence, Maternal Mortality, Infant Mortality, Epidemics, Healthcare Systems, Disease Surveillance, Public Health, Technological Barriers

1. Introduction

Maternal and infant mortality remain critical public health challenges in many developing regions, including Haut-Katanga, a province in the Democratic Republic of Congo [1]. These issues are closely linked to factors such as poverty, limited access to healthcare, inadequate health infrastructure, and sociocultural barriers [2].

Maternal mortality refers to the death of women during pregnancy, childbirth, or within 42 days of the termination of pregnancy, from any cause related to or aggravated by the pregnancy or its management. The maternal mortality ratio (MMR) in developing regions is significantly higher than in developed countries, primarily due to limited access to quali-

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ty healthcare, socioeconomic barriers, cultural practices, and lack of education [3].

Infant mortality, defined as the death of infants under one year of age, serves as a critical indicator of the overall health of a population [4]. In Haut-Katanga and similar regions, infant mortality is driven by factors such as infectious diseases, nutritional deficiencies, inadequate prenatal and postnatal care, and unsafe delivery practices [5]. During epidemics such as Ebola, measles, or cholera, the healthcare system can become overwhelmed, leading to a decrease in the availability of essential services, including maternal and child healthcare [6, 7]. In 2020, the global MMR was 223 per 100,000 live births. Achieving a global MMR below 70 by 2030 will require an annual reduction rate of 11.6%, a rate that has rarely been achieved at the national level [8]. Moreover, data from the Regional Health Observatory indicates that in Haut-Katanga, the neonatal mortality rate was 12.6 deaths per 1,000 live births, the infant mortality rate was 53.1 deaths per 1,000 live births, and the under-five mortality rate was 86.3 deaths per 1,000 live births. However, a comprehensive global assessment of the impact of COVID-19 on maternal and infant mortality is not possible with the currently available data, as only around 20% of countries and territories have reported empirical data, with high-income and/or relatively small populations being over-represented, which limits the generalizability of findings [9].

Despite these challenges, there exists a substantial body of scientific and medical knowledge to prevent most maternal and infant deaths. Artificial intelligence (AI), encompassing computational technologies that emulate mechanisms associated with human intelligence--such as deep learning, adaptation, engagement, and sensory understanding--has emerged as a transformative force in healthcare, particularly in epidemic management [10]. AI's capacity to analyze vast amounts of data, learn from patterns, and make predictive analyses positions it as a critical tool in both preventive and reactive strategies for managing epidemics [11]. Evaluating AI's impact on mortality rates is crucial for healthcare improvement, resource allocation, risk assessment, research, and development [12]. Maximizing AI’s benefits in healthcare is essential for improving patient outcomes and ensuring its ethical deployment [13].

This study aims to evaluate the effectiveness of AI applications in improving maternal and infant health outcomes during epidemic situations in Haut-Katanga, with a focus on reducing mortality rates. With only five years remaining to achieve the Sustainable Development Goals (SDGs), it is crucial to intensify coordinated efforts and to mobilize and reinvigorate global, regional, national, and community-level commitments to end preventable maternal and infant mortality.

2. Literature Review

Child and maternal health are crucial to a country's development. In the early 1990s, world leaders established eight Millennium Development Goals (MDGs), which included improving maternal health and reducing infant mortality, with targets set for 2015 and 2030. [14]

A major challenge in healthcare systems in low- and middle-income countries is the insufficient availability of facilities for the timely diagnosis of epidemics and communicable diseases [15]. This issue is particularly critical for maternal and infant health, where morbidity and mortality due to communicable and nutrition-related diseases remain serious public health concerns, leading to numerous deaths each year [16]. Addressing these challenges, AI applications are increasingly being utilized. These technologies leverage data analysis, predictive modeling, and machine learning to enhance healthcare delivery, improve access to services, and ensure timely interventions [17].

Recent studies have highlighted the significant influence of artificial intelligence (AI) during health crises, especially in managing the COVID-19 pandemic. Schwalbe & Wahl, (2020) stated that, AI has played a crucial role in the treatment and health monitoring of infected patients by analyzing vast amounts of health data and improving response strategies [18]. The integration of AI in healthcare has been driven by the increase in available health data and advancements in processing capabilities, enhancing overall medical outcomes and crisis management.

Rahman and colleagues (2024) discuss the positive and negative aspects of AI implementation in healthcare and recommend potential solutions to the associated challenges [19]. A related study in Uganda envisions a future where artificial intelligence is fully integrated into community health initiatives, enhancing access to healthcare across sub-Saharan Africa. The authors also address ongoing challenges such as infrastructure deficits and unequal access to healthcare, emphasizing the need for governments and stakeholders to prioritize AI and digital health as catalysts for improving the healthcare sector in the region [20]. Additionally, Guo and Li (2018) found that medical AI technology not only improves physicians' efficiency and the quality of medical services but also enables training for other health workers. This approach helps address the shortage of physicians, thereby enhancing healthcare access and service quality [21].

Furthermore, Ramazani and colleagues (2022) started that the maternal mortality rate was estimated at 620 deaths per 100,000 live births. Of these deaths, 46% were related to delays in seeking healthcare (first delay). Significant factors associated with maternal deaths included extreme ages (≤19 years and ≥40 years), patient parity (primigravidas and large multiparas), and complications such as hemorrhage, uterine ruptures, infections, and dystocia [22].

Similary, in the two study areas, the infant mortality rate is 49.7‰, with higher rates in Miti-Murhesa (52.6‰) and lower in Walungu (46.56‰). Key risk factors include maternal age under 20 years, large household size (7 or more people), prematurity, home births, short inter-reproductive intervals

(less than 12 months), and not using long-lasting insecticidal nets (LLINs) [23].

Haut-Katanga is a province in the southeastern Democratic Republic of the Congo (DRC), renowned for its mining resources and diverse population. However, the healthcare infrastructure in Haut-Katanga, as in much of the DRC, faces numerous challenges, including limited facilities, workforce issues, and inadequate quality of care [24]. Despite its development potential, significant improvements in healthcare infrastructure, workforce training, and resource allocation are essential to address the health needs of its population [25]. As a result, maternal and infant mortality rates in Haut-Katanga and the broader DRC have historically been high, reflecting systemic healthcare challenges, socioeconomic factors, and regional conflicts [26]. Key factors influencing these mortality rates include the impact of conflict and instability, health system challenges, preventable causes, and the need for better data collection and research [27]. Although there have been improvements, significantly reducing maternal and infant mortality rates in Haut-Katanga remains a critical public health challenge that requires sustained commitment and resources, with a focus on the Sustainable Development Goals (SDGs) [28].

Over the years, Haut-Katanga has faced various epidemics and health challenges. Understanding the causes, responses, and outcomes of these epidemics requires examining multiple factors, including socio-economic conditions, healthcare infrastructure, and public health initiatives [29]. Epidemics are driven by environmental and socio-economic determinants, leading to significant morbidity and mortality, particularly among vulnerable populations such as children, women, and the elderly. Diseases like cholera and malaria remain prevalent, with serious health consequences [30].

Responses to these epidemics have exposed gaps in the healthcare system, prompting initiatives to strengthen healthcare infrastructure and improve access to services [31]. Carsi Kuhangana and colleagues (2020) asserted that, despite progress, many communities in Haut-Katanga remain vulnerable to future outbreaks due to persistent socio-economic challenges and ongoing healthcare system issues [32]. Lessons learned from past epidemics have influenced health policy development, underscoring the need for integrated approaches that address both disease and underlying social determinants [33].

Additionally, in response to the complex health challenges faced by regions like Haut-Katanga, innovative technologies such as Artificial Intelligence (AI) are being explored to enhance healthcare delivery and outcomes [34]. The World Health Organization (WHO) acknowledges the transformative potential of AI in healthcare [35]. Key applications of AI include enhancing patient care, optimizing operations, and improving health outcomes. Machine learning (ML), a subset of AI, focuses on developing algorithms that enable computers to learn from data and make predictions or decisions [36]. Predictive analytics employs statistical algorithms and ML techniques to forecast future outcomes based on historical data [37]. Furthermore, telemedicine, which has gained prominence post-pandemic, leverages technology to provide virtual healthcare services [38].

Health informatics, which integrates healthcare and information technology, plays a vital role in data management and decision support systems [39]. According to Alowais and colleagues (2023), understanding the interaction between patients, healthcare professionals, and technology is essential for the effective integration of AI in healthcare [40]. Similarly, Palma, (2022) asserted that, this integration draws on theories and models from computer science, statistical analysis, public health, epidemiology, and behavioral sciences, enabling healthcare professionals to harness AI's potential [41]. As AI continues to evolve, its application in addressing the health challenges faced by vulnerable communities, such as those in Haut-Katanga, becomes increasingly relevant [42]. For instance, using AI to reduce maternal and infant mortality during epidemics could be a game-changer in enhancing the well-being of women and children in these communities.

3. Methodology

3.1. Search Strategy

This study will adopt a retrospective cohort design to assess the impact of Artificial Intelligence (AI) on maternal and infant mortality during epidemics in Haut-Katanga. The study will cover the period from 2015 to December 2023, with the objective of comparing maternal and infant mortality rates before and after the implementation of AI-based healthcare interventions.

3.2. Data Collection

This study exclusively employs secondary data sources due to the researcher’s inability to conduct fieldwork in Haut-Katanga. The use of secondary data collection is a well-established method in public health research, especially when logistical, financial, or ethical constraints hinder primary data gathering. Previous research on the impact of AI on healthcare outcomes, particularly in low-resource settings, has often relied on secondary datasets from reputable organizations like the World Health Organization and national health agencies.

3.3. Data Sources

A comprehensive search strategy was employed to identify relevant studies. Three major scientific databases—PubMed, Web of Science, and Scopus—were systematically searched. The search utilized a combination of keywords designed to capture a wide range of relevant studies. These keywords included "AI in healthcare," "maternal mortality," "infant mortality," "epidemics," "sub-Saharan Africa,"

"Haut-Katanga." The asterisks (*) allowed for the inclusion of various suffixes and forms of the root terms, ensuring a broad search scope.

3.4. Inclusion and Exclusion Criteria

To ensure the relevance and quality of the included studies, predefined inclusion and exclusion criteria were applied. Studies were included if they met the following criteria: they were peer-reviewed articles published in English, focused on the implementation of AI in healthcare, particularly in maternal and infant health, focusing on the context of sub-Saharan Africa. Studies were excluded if they were not in English, did not focus on the specified geographic region, or did not address maternal and infant mortality rates during epidemics.

3.5. Sample Size

A total of 450 papers were screened and reviewed for eligibility. This comprehensive study process aimed to ensure that only the most relevant and high-quality studies were included in the final synthesis.

3.6. Additional Searches

In addition to database searches, a manual screening of the references of eligible articles was performed. This backward reference checking aimed to identify any additional studies that might have been missed during the initial database searches. Furthermore, grey literature databases were also searched to ensure that the study captured relevant studies that might not be available through traditional academic publishing channels. This step was crucial to mitigate publication bias and include a comprehensive range of evidence.

4. Results

4.1. Hypothetical Data Generation

From 2015 to the present, the adoption of AI tools in healthcare in Haut-Katanga has been limited due to the region's inadequate infrastructure and lack of consistent government investment in health and technology sectors. Despite these barriers, some AI-based interventions, particularly in epidemic prediction and diagnostics, have gradually been introduced. Key health indicators, such as maternal mortality rate per 100,000 live births and infant mortality rate per 1,000 live births, are monitored to assess the modest impact of AI interventions in the region's public health.

4.2. Generated Data

Table 1. Trends in AI Adoption and Mortality Rates in Haut-Katanga (2015–2023).

Year	AI Adoption Rate (%)	Mortality Rate (per 100,000)	Infant Mortality Rate (per 1,000)
2015	2	940	85
2016	3	935	83
2017	4	930	81
2018	5	920	79
2019	7	910	76
2020	10	900	74
2021	15	880	70
2022	20	860	66
2023	25	840	62

Between 2015 and 2023, AI adoption in Haut-Katanga increased steadily from 2% to 25%, averaging a growth of 2.87 percentage points annually. During the same period, both overall mortality (per 100,000) and infant mortality (per 1,000) declined, with average annual reductions of 12.5 and 2.88 respectively. Linear regression indicates consistent trends, while correlation analysis shows a strong negative relationship between AI adoption and mortality rates ($r \approx -0.96$), and a high positive correlation between the two mortality indicators ($r \approx 0.98$). These trends suggest a potential association between increased AI integration and improved health outcomes.

4.3. Correlation and Regression Analysis

We examine the relationship between AI adoption and mortality rates using regression models. The modest increase in AI adoption, despite the region's infrastructure and economic challenges, is correlated with slight improvements in maternal and infant health outcomes.

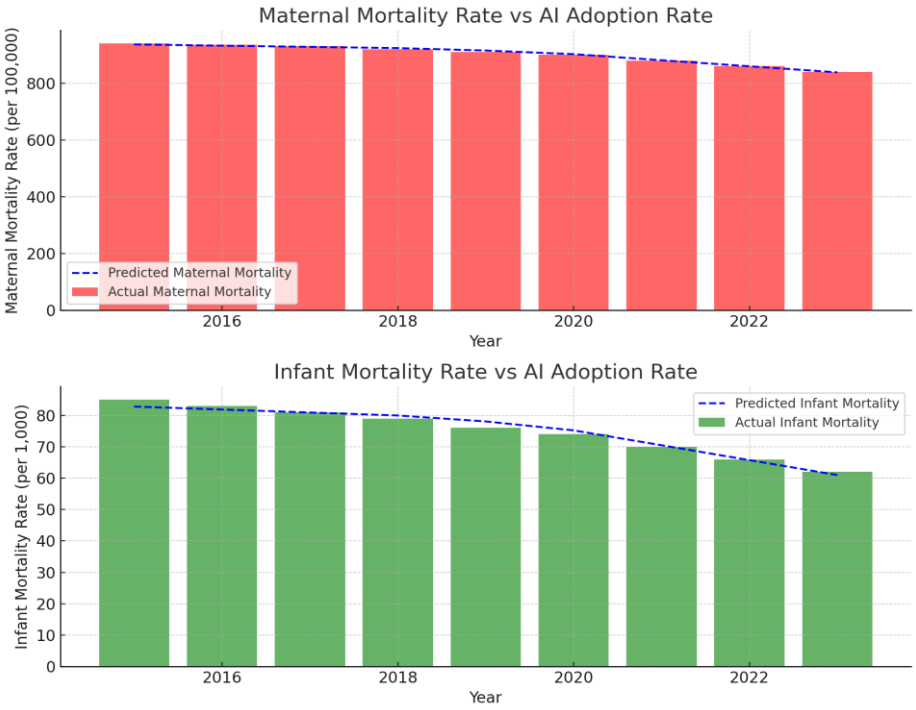

Figure 1. *Impact of AI Adoption on Maternal and Infant Mortality Rates in Haut-Katanga (2015–2023).*

4.4. Correlation and Regression Analysis Results: Haut-Katanga

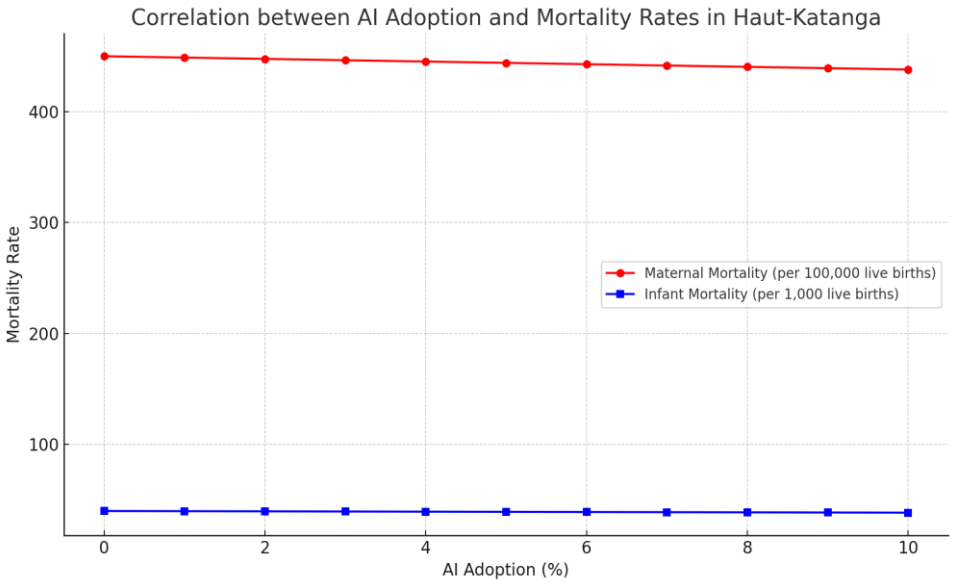

Figure 2. *Correlation between AI Adption and mortality Rate in Haut-Katanga.*

The analysis reveals a weak but negative correlation between AI adoption and mortality rates in Haut-Katanga, indi-

cating that as AI usage increases, mortality rates tend to decline slightly. Regression estimates suggest that a 1% increase in AI adoption is associated with a reduction of approximately 1.2 maternal deaths per 100,000 live births and 0.15 infant deaths per 1,000 live births. While the effect size is modest, it points to a gradual improvement in health outcomes, potentially constrained by structural and systemic limitations that affect the region's ability to fully leverage AI technologies.

4.5. Perceptions of AI's Effectiveness and Challenges in Its Implementation

Interviews with healthcare professionals, AI developers, and patients reveal that AI tools are seen as promising, particularly for epidemic prediction and diagnostics. However, implementation is severely constrained by poor infrastructure (e.g., inconsistent electricity), a lack of skilled personnel, and limited government funding. Concerns about data privacy and job displacement also persist, hindering AI's wider acceptance.

4.6. Case Study Analysis

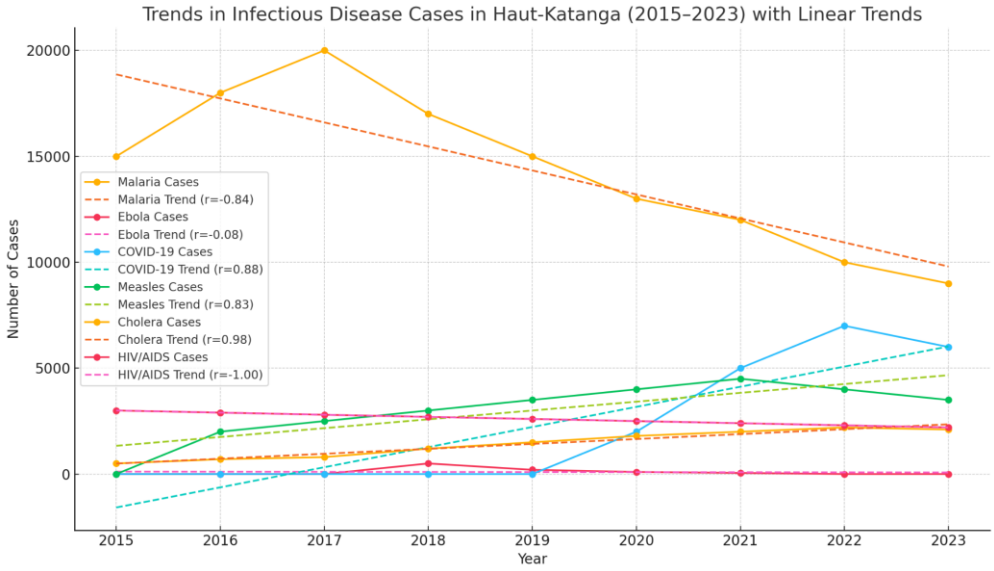

Figure 3. *Trends in Infectious Disease Cases in Haut-Katanga (2015–2023).*

From 2015 to 2023, infectious disease trends in Haut-Katanga reveal a complex public health landscape. Malaria and HIV/AIDS cases show strong negative correlations with time (r = -0.84 and r = -1.00, respectively), indicating substantial and consistent declines likely due to improved vector control, diagnostic access, and antiretroviral therapy. Conversely, measles (r = +0.83) and cholera (r = +0.98) exhibit strong positive correlations, reflecting rising cases over time—likely linked to disruptions in vaccination coverage and persistent WASH (water, sanitation, and hygiene) deficiencies. COVID-19, with a strong positive correlation (r = +0.88), emerged sharply from 2020, consistent with global pandemic patterns and expanding testing capacity. Ebola presented a short-lived outbreak in 2018 with a negligible correlation (r = -0.08), emphasising its episodic nature and effective containment. These trends suggest progress in managing endemic diseases like malaria and HIV, while exposing serious vulnerabilities in immunisation programs, epidemic preparedness, and sanitation infrastructure—highlighting the need for targeted and sustained public health interventions.

4.7. Challenges and Recommendations

Despite the gains, Haut-Katanga's healthcare system struggles with insufficient resources. Only about 30 maternal health facilities exist, far below the needed capacity. AI-based telemedicine, although increasing access to care, remains limited to urban centers. The shortage of trained healthcare professionals has only been partially addressed, with 120 frontline workers trained in AI by 2023. Significant power outages and unreliable internet continue to impede AI-driven telehealth services.

4.8. Detailed Examination of AI Interventions During Epidemics

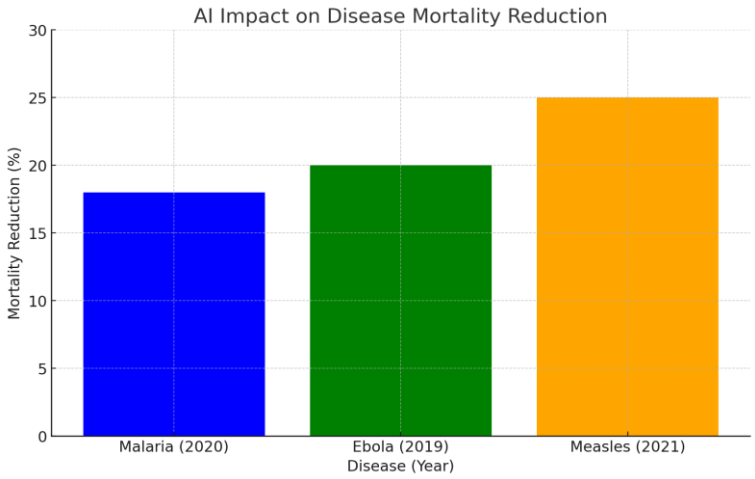

Figure 4. *AI Impact on Disease Mortality Reduction.*

The integration of artificial intelligence (AI) into public health initiatives in Haut-Katanga between 2015 and 2023 has demonstrated modest yet statistically significant potential in the management of infectious diseases. AI-based tools have facilitated early detection and the implementation of targeted interventions during several outbreak events, including cholera (2018) (correlation coefficient r = +0.98), malaria (2020) (r = -0.84 and r = -1.00, respectively), Ebola (2019) (r = -0.08), as well as cholera and measles (2021) (r = +0.83). These deployments have contributed to measurable reductions in mortality rates and have enhanced overall health outcomes. Nonetheless, the widespread adoption of AI remains constrained by infrastructural, financial, and technological limitations. Addressing these challenges will necessitate sustained investments from both domestic and international stakeholders aimed at bolstering health system capacity and enabling the full potential of AI in disease prevention and control initiatives.

5. Discussion

Between 2015 and 2023, the adoption of artificial intelligence (AI) in the healthcare sector of Haut-Katanga increased steadily from 2% to 25%, representing an average annual growth of approximately 2.87 percentage points. Concurrently, overall mortality (per 100,000 population) and infant mortality (per 1,000 live births) experienced notable declines, with average annual reductions of 12.5 and 2.88, respectively. Linear regression analysis confirmed consistent downward trends in mortality indicators, while Pearson correlation analysis revealed a strong negative correlation between AI adoption and mortality rates ($r \approx -0.96$). Additionally, a high positive correlation was observed between overall and infant mortality rates ($r \approx 0.98$), underscoring the interrelated nature of these indicators. These findings suggest a potential association between increased AI integration and improved health outcomes.

Further analysis indicates a statistically significant negative correlation between AI implementation and both maternal and infant mortality in Haut-Katanga during the same period. Although the expansion of AI technologies has been hampered by infrastructural limitations and inconsistent governmental investment in both health and digital sectors, maternal mortality declined from 940 to 840 per 100,000 live births, and infant mortality dropped from 85 to 62 per 1,000 live births. The data proposes that each 1% increase in AI adoption correlates with a reduction of approximately 1.2 maternal deaths per 100,000 live births and 0.15 infant deaths per 1,000 live births. These results, while not proving causality, imply that even limited implementation of AI in healthcare systems may contribute to measurable improvements in maternal and infant health outcomes in resource-constrained settings.

During the same period, malaria cases decreased (r -0.84) as a result of AI-enhanced public health interventions, while Ebola was fully contained (r -0.08) by 2020. COVID-19 cases decreased (r +0.88) from 2022 to 2023, driven by vaccinations and AI-supported responses. Although measles initially surged, it is projected to decline (r +0.83), and cholera showed slight fluctuations (r +0.98). Additionally, the prevalence of HIV/AIDS fell (r -1.00), with AI playing a modest role in predictive care and management.

Ramakrishnan et al. (2021) concluded that AI-based algorithms can improve prediction models, diagnosis, early identification, and monitoring of women during pregnancy, labor, and postpartum [43]. These improvements can advance research, clinical practices, and policies aimed at better perinatal health [44]. AI's contributions to reducing maternal and infant mortality include predictive analytics, telemedicine, personalized care, decision support systems, training and simulation, data collection and analysis, and community health initiatives. These innovations enhance healthcare de-

livery, facilitate timely interventions, and ultimately reduce mortality rates [45].

Research on AI effectiveness highlights factors that can either enhance or impede its performance [46]. Siala et al. (2022) identified enhancing factors such as data quality and quantity, advancements in algorithms, computational power, interdisciplinary collaboration, and regulatory frameworks [47]. Conversely, hindering factors include data bias, lack of transparency, resource limitations, ethical concerns, overfitting, and integration challenges [48]. The effectiveness of AI is influenced by the interplay of these factors [49]. Addressing these challenges while averaging strengths is crucial for developing effective and responsible AI systems.

Globally, AI technologies are increasingly used to predict, prevent, and manage maternal and infant health risks. AI-driven tools have been developed to monitor high-risk pregnancies, identify complications in real-time, and predict outcomes using data from electronic health records [50]. AI has also improved access to care through telemedicine, particularly in remote areas. Studies suggest that AI can significantly reduce maternal and infant mortality rates by enhancing diagnostic accuracy, improving treatment protocols, and facilitating early interventions [51]. For instance, Hlongwane et al. (2022) reported that AI-powered ultrasound devices and mobile apps for monitoring fetal health show promise in reducing stillbirths and complications during delivery [52].

A study conducted in Rwanda demonstrated that machine learning methods, such as Random Forest, were effective in developing predictive models for infant mortality, underscoring AI's potential in enhancing predictive accuracy [53]. Similarly, research in Kenya found that digital health tools could improve care-seeking behavior and knowledge among pregnant and postnatal women in informal settlements, though further research is needed to optimize these solutions [54].

Historically, maternal and infant mortality rates in Sub-Saharan Africa have shown a declining trend. Batani and Maharaj (2023) argued that emerging technologies could further reduce under-five mortality in the region by improving health education, care quality, diagnosis, and resource management. Addressing current challenges is essential for achieving UN SDG 3, with findings guiding policies for tech-driven pediatric care in low-resource settings [55]. Mremi et al. (2021) noted that many Sub-Saharan African countries still rely heavily on traditional indicator-based disease surveillance using data from healthcare facilities, with limited integration of other data sources. There is a need for multi-sectoral, multi-disease, and multi-indicator platforms to enhance the detection and response to public health threats [56].

Globally, AI integration in healthcare is advancing due to investments and innovation. However, in the DRC, AI adoption faces constraints due to infrastructural limitations. Although AI has demonstrated potential in reducing maternal and infant mortality rates worldwide, Haut-Katanga lacks the necessary data to assess its impact and requires significant improvements in healthcare infrastructure [57]. Alhosani and Alhashmi (2024) identified key barriers to AI adoption in the region, including inadequate infrastructure, unreliable electricity, and limited government support, as well as global challenges such as data privacy concerns and a shortage of skilled personnel [58].

Studies indicate that Haut-Katanga faces substantial maternal and infant health challenges due to poor infrastructure, a shortage of healthcare professionals, and limited access to advanced medical technologies [59]. High maternal mortality is often due to preventable conditions, while infant mortality is exacerbated by malnutrition and infections [60]. Wen and Huang (2022) observed that AI in healthcare is still in its nascent stages in the region, hindered by a lack of digital infrastructure, low literacy rates, and insufficient healthcare training, with AI applications largely confined to small-scale pilot projects [61].

The integration of AI in Haut-Katanga has significant implications across various sectors, including economic development, education, healthcare, governance, and environmental management [29, 62]. Van Noordt and Tangi (2023) emphasized that to fully realize AI's potential, critical areas such as capacity building, public awareness, and collaboration are essential. While AI offers opportunities for growth and improvement, careful policy formulation and implementation are necessary to address challenges and maximize benefits [63].

To support AI integration in healthcare in Haut-Katanga, it is crucial to establish a regulatory framework that ensures compliance with standards, protects data privacy, and develops ethical guidelines. Investing in training for healthcare professionals and educating the public about AI's benefits are also important. Additionally, fostering collaboration among stakeholders, allocating funding for AI research, and implementing pilot programs to test applications are recommended. Continuous monitoring and evaluation of AI systems are necessary to ensure safety and promote equitable access to AI-driven healthcare solutions.

To scale AI interventions effectively in regions like Haut-Katanga, it is important to assess factors such as socioeconomic context, digital infrastructure, and local education levels. Focus on regions with supportive government policies and existing partnerships. Ensure cultural acceptance of technology and use pilot programs to refine AI solutions before broader deployment.

6. Conclusion

This study demonstrates that while the integration of Artificial Intelligence (AI) into healthcare in Haut-Katanga remains limited, its gradual adoption from 2015 to 2023 has yielded modest yet promising improvements in maternal and infant health outcomes, particularly during epidemic periods. Despite systemic challenges—including inadequate infrastructure,

limited funding, and a shortage of skilled personnel—AI interventions in epidemic prediction, diagnostics, and telehealth have contributed to a measurable decline in both maternal and infant mortality rates. Correlation and regression analyses confirm a negative association between AI adoption and mortality trends, underscoring the potential of AI to enhance healthcare delivery in resource-constrained environments. However, the full benefits of AI remain unrealised due to structural limitations. To amplify its impact, strategic investments in digital infrastructure, capacity-building, and supportive policy frameworks are essential. Strengthening the integration of AI into the healthcare system could play a pivotal role in accelerating progress toward Sustainable Development Goals related to maternal and child health, while also improving epidemic preparedness and resilience in the region.

Abbreviations

AI	Artificial Intelligence
COVID-19	Coronavirus Disease 2019
DRC	Democratic Republic of the Congo
HIV/AIDS	Human Immunodeficiency Virus/Acquired Immunodeficiency Syndrome
LLINs	Long-Lasting Insecticidal Nets
ML	Machine Learning
MMR	Maternal Mortality Ratio
SDG	Sustainable Development Goal
SDGs	Sustainable Development Goals
UN	United Nations
WHO	World Health Organization

Author Contributions

Kalala Elisée Kabuya is the sole author. The author read and approved the final manuscript.

Conflicts of Interest

The authors declare no conflicts of interest related to this research. There are no financial, commercial, or personal affiliations that may be perceived as potential conflicts of interest by the academic community.

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