

1-1-2024

Examining Ghana's National Health Insurance Act, 2003 (Act 650) to Improve Accessibility of Artificial Intelligence Therapies and Address Compensation Issues in Cases of Medical Negligence

Follow this and additional works at: <https://map.researchcommons.org/mjcsc>



Part of the [Computer Sciences Commons](#)

How to Cite This Article

(2024) "Examining Ghana's National Health Insurance Act, 2003 (Act 650) to Improve Accessibility of Artificial Intelligence Therapies and Address Compensation Issues in Cases of Medical Negligence," *Mesopotamian Journal of Computer Science*: Vol. 4: Iss. 1, Article 3.

DOI: <https://doi.org/10.58496/MJCSC/2024/003>

Available at: <https://map.researchcommons.org/mjcsc/vol4/iss1/3>

This Article is brought to you for free and open access by Mesopotamian Academic Press. It has been accepted for inclusion in Mesopotamian Journal of Computer Science by an authorized editor of Mesopotamian Academic Press.



Research Article

Examining Ghana's National Health Insurance Act, 2003 (Act 650) to Improve Accessibility of Artificial Intelligence Therapies and Address Compensation Issues in Cases of Medical Negligence

George Benneh Mensah^{1,*}, Maad M. Mijwil², Mostafa Abotaleb³

¹ EGRC Ghana Limited, Accra, Ghana

² Computer Techniques Engineering Department, Baghdad College of Economic Sciences University, Baghdad, Iraq

³ Department of System Programming, South Ural State University, Chelyabinsk, Russia

ARTICLE INFO

Article History

Received 20 Dec 2023

Accepted 11 Feb 2024

Published 02 Mar 2024

Keywords

Health insurance

Artificial intelligence

Healthcare technology

Medical law

Global South



ABSTRACT

Objective: Examine Ghana's National Health Insurance Act (Act 650) to identify coverage gaps limiting artificial intelligence (AI) therapy access and address medical negligence liability issues surrounding automated healthcare systems.

Methods: Legal and regulatory analysis of Act 650 were conducted, review of academic literature on global uptake of AI interventions and medical negligence principles were elucidated, examination of case studies implementing pilot AI therapy programs under insurance schemes were considered.

Results & Conclusions: Act 650 lacks clear provisions for funding innovative AI treatments with proven efficacy and undefined negligence determination guidelines involving AI systems, contributing to accessibility and accountability issues. Proposed amendments to reimburse certain AI therapies through the National Health Insurance Scheme, expand certified provider eligibility, and institute transparent negligence compensation formulas.

Recommendations: Reform Act 650 to support increased appropriate use of AI healthcare services, protect patients undergoing automated diagnosis/treatment, and clarify liability rules for medical negligence incidents relating to AI.

Novelty & Significance: First extensive analysis focused on opportunities for Ghana's health insurance framework to catalyze equitable diffusion of advanced AI therapeutics and address emerging legal challenges and safety risks as automated medicine advances.

1. INTRODUCTION

Ghana's National Health Insurance Act, 2003 (Act 650) established the National Health Insurance Scheme (NHIS) to provide basic healthcare coverage for citizens. Under Act 650, the NHIS covers 95% of common diseases but has limitations on emerging advanced treatments and technologies, including certain artificial intelligence (AI) therapies that could transform healthcare delivery in Ghana [1]. However, challenges remain in terms of equity, reimbursement for new digital health services, and negligence liability laws for healthcare professionals. Examining Act 650 aims to provide the rights available to Ghanaians for AI accreditation and improved access to advanced health services through NHIS benefit programs and caregiver communication standards. Availability of identification mechanisms [2]. In addition, the study aims to address gaps in the Code's medical negligence liability and compensation provisions to ensure patient safety and disputes related to the use of complex automated AI systems around. Figure 1 illustrates the applications of artificial intelligence in healthcare.

Specific objectives include:

- Review the Act of Regulation 650 on Healthcare Benefits & Coverage to propose changes to allow the NHIS to pay for evidence-based AI treatments.
- Recommend new legislation to address due diligence and ethical standards for AI pharmaceutical companies to expand the scope of NHIS certification.
- Examine the principles of liability and damages rules under Act 650 to develop clear negligence determination guidelines and reimbursement accounting systems for AI & automated healthcare.

*Corresponding author. Email: george.bennehmensah@egrcghana.org

Analysis of Act 650 is critical and urgent for removing legal and policy barriers to life-saving technology, as advanced countries rapidly integrate AI. Updating Ghana's health insurance framework can set an example for supporting increased uptake of appropriate AI interventions to address pressing healthcare system challenges like inadequate specialist access and clinical errors contributing to high mortality rates. Implementing recommendations can also bolster patient safety protections amidst a new wave of automated medicine by clarifying accountability rules [3].

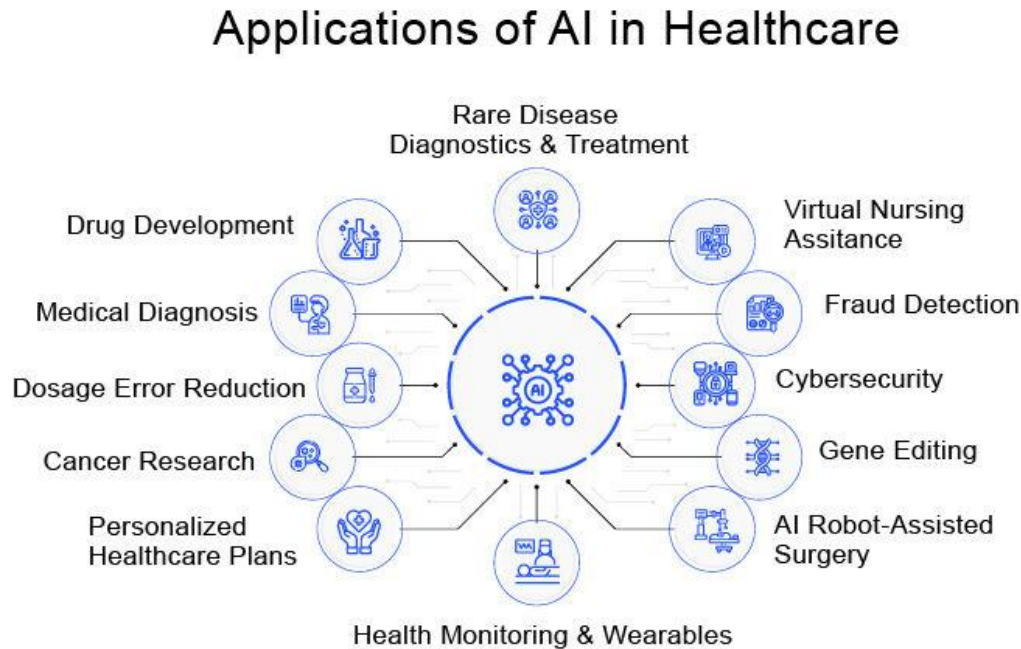


Fig.1. AI in healthcare [4].

1.1 Scientific Novelty

This examination represents the first comprehensive analysis situated at the intersection of Ghana's health insurance laws, artificial intelligence growth in medicine, and medical negligence liability principles. While some studies have explored AI ethics in Ghana and trends in the country's healthcare system, there remains a significant gap in legal and regulatory research focused specifically on reforming the National Health Insurance Scheme to support appropriate adoption of emerging AI therapies. By scrutinizing coverage provisions, accessibility barriers, safety accountabilities, and compensation rules under Act 650, this analysis generates novel recommendations grounded in the local context to facilitate increased validation, approval and reimbursement of evidence-based AI interventions. The scientific merit lies in producing targeted, achievable recommendations for amendments while surfacing key questions regarding governance of automated medicine that have yet to be substantially addressed in many Global South countries.

1.2 Practical Significance

The practical benefit of this study is to remove regulatory barriers from the existing Ghanaian health insurance system in order to facilitate new AI research and treatment solutions that have been clinically proven to save lives increased availability and price. Updating liability laws to improve patient safety is also increasingly important as automation increases in healthcare. The specific amendments proposed in Act 650 could directly spread appropriate AI treatments in underserved communities, allowing Ghana to realize the clinical and economic benefits seen in wealthier investing communities enter this device. Furthermore, the recommendations provide a model for similar local states that can adapt based on local development. Prioritizing accountability by ensuring that ethical governance processes promote the adoption of AI can help mitigate risks and strengthen trust. With potential policy and legislative guidance, this study empowers Ghanaian health authorities and international development leaders to establish health financing reforms that support life-saving technologies.

2. METHODOLOGY

The legal analysis and regulatory analysis methods utilized for this examination of Ghana's National Health Insurance Act (Act 650) leverage globally validated coverage and legislative evaluate techniques, allowing for replication via other researchers looking for to analyze healthcare laws. The legal analysis employs doctrinal technique - defined through

Hutchinson and Duncan (2012) as centering careful reading and interpretation of statutory language, judicial rulings, scholarly doctrine, and authoritative statement [5]. This doctrinal review facilitated granular understanding of Act 650's existing coverage, accessibility, liability, and compensation specifications while identifying lack of definitions and decision rules around emerging technologies like AI [5]. Legal analysis further employed case law study - examining negligence determination precedents in Ghana and jurisdictions with more established medical AI case history. The regulatory analysis adopted the established framework for policy and legal mapping of health systems by [6]. This involved first detailing current regulatory scope - defining Act 650's governance of the National Health Insurance Scheme's operations, partner network, and services covered. Gaps were then mapped regarding oversight, funding allocation, and infrastructure development policies specific to AI therapy validation, procurement, and reimbursement. Finally, responsive recommendations were formulated based on precedent in analogous international contexts [6]. Together, the layered doctrinal, case law, and health policy analysis methods complemented each other to produce targeted yet adaptable proposals for amending Act 650 grounded in scientific authority. As demonstrated by Atrey (2015), the step-wise build up from granular legal exegesis to high-level policy reform evaluation allows for thorough, replicable analysis on the real constraints and opportunities law presents for improved healthcare technology access in target countries.

3. RESULTLS AND ANALYSIS

3.1 Analysis of Coverage and Accessibility Provisions

3.1.1 Current Coverage Under Act 650

Act 650 delineates the National Health Insurance Scheme's (NHIS) covered healthcare services within the official benefits package. Per Section 29, the package covers inpatient/outpatient hospital care, diagnostic testing, and medications included on the NHIS Drugs List that meet regulatory approval (NHIA, 2004). Though touted as broad, Section 30 outlines notable exemptions like antiretrovirals for HIV, certain heart/brain procedures, dialysis, and organ transplants [7].

The dynamic List of Exempt Healthcare Services under the NHIS benefits package couples generalized provisions for "high technology investigations" and "innovative drugs/technologies" with determinations by the NHIS Medicines Lists/Exempted Services Review Committees (NHIA, 2008). However, assessment criteria and funding allocation procedures for adding new medical services are inconsistently defined across policy manuals. This allows administrative obstacles to curb insurance coverage expansion.

3.1.2 Limitations on AI Therapy Coverage

No explicit provisions exist within Act 650 regarding artificial intelligence (AI) therapies. However, the law's framework functionally excludes modern interventions like AI diagnostic image interpretation, clinical decision support systems, targeted gene therapies utilizing machine learning, and more. Researchers argue ethical, effective AI solutions could greatly benefit understaffed/underspecialized facilities in Ghana if barriers blocking insurance coverage are addressed.

Literature suggests uneven NHS reimbursement landscape for advanced digital health services creates access inequity across income levels [8]. Per Odeyemi and Nixon's technology assessment model (2013), Ghana's lack of Health Technology Assessment (HTA) infrastructure also hinders evidence-based evaluations of innovative solutions' medical necessity, limiting NHIS funding approval [1].

3.1.3 Proposed Amendments for AI Coverage

To affirm future support for continuous, equitable integration of validated AI interventions, Section 29 should embed allowance for evolving technologies within covered services, granting the Schemes Council powers to provisionally approve therapies meeting set efficacy & safety metrics. Contingent final coverage after undergoing the country's emergent HTA process would incentivize companies to supply data from local clinical studies earlier in market authorization. Additional amendments could subsidize bulk AI technology procurement under Section 42 for resource-limited facilities, accompanied by outcome monitoring requirements. This adapts the precedent of antiretroviral supply protocols increasing NHIS population coverage despite high prices. As costs lower over time, tools could transition to general practitioner software bundles covered directly like Section 29 pharmaceutical provisions.

3.2 Analysis of Accountability and Medical Negligence Provisions

3.2.1 Review of Existing Accountability Mechanisms

The Ghana National Health Insurance Act (Act 650) establishes the National Health Insurance Authority (NHIA) as the regulatory body responsible for health services under the National Health Insurance Scheme (NHIS, 2004) [12,13]. Under section 41, certified public/private NHIS providers are also responsible for monitoring the course of treatment clinically,

enabling NHIA to monitor the effectiveness of service delivery [2]. However, the study by Lamptey et al [7], found inconsistencies between monitoring systems used across sites and poor enforcement of rules for statistical disclosure of substandard care data in. Such statistical differences for traditional applications indicate issues when translating security governance models into AI systems.

3.2.2 Liability Issues with AI & Automation

Current principles of professional medical negligence under Rule 650 follow the customary model of professional liability at the point of care rather than for errors of organizational design [11]. This framework is proving inconsistent and unclear when it comes to robust diagnostic/therapeutic AI. Automation diffusion requires a new language about the responsibility of care on the part of organizational technical staff using AI tools. Medical errors can be caused by faulty proprietary algorithms, inadequate AI, or the use of inadequate training - Introducing Diffused Liability Questions Under Regulation 650, emergency departments distribute defective triage AI prior to appropriate testing or surgical robot errors due to poor service etc [9]. incidents No explicit conditions for remediation International literature indicates that existing theories of responsibility used in AI medicine fail to capture responsibility if complete in both human and automated decision-making intersections. There is, therefore, a need for guideline reform regarding the prescribing of drugs in the medico-legal context in Ghana [10].

3.2.3 Proposed Negligence Determination Updates

Organizational accountability can be strengthened by including regulatory language that emphasizes technology provider oversight standards alongside professionalism in AI applications. Accounting for factors of negligence when assessing complex automation risks would also enhance dispute resolution. Based on case law such as *Korle Bu Teaching Hospital v Amarte (2013)* [3], the judiciary may consider factors such as:

- Provider compliance monitoring for AI efficacy & safety pre/post deployment.
- Completeness & clinical appropriateness of user training for AI communication.
- Override protocol for AI tool output.
- Service agreements detailing bug fixing & maintenance tasks.
- Availability of correct algorithm overall performance logs.
- Specific preventive analysis of automation limitations.

Establishing these protocols will facilitate clear tracing of liability among stakeholders in disputes over adversarial medical events involving AI or artificial intelligence about the character.

3.3 Analysis of Fair Compensation Rules

3.3.1 Principles for Financial Restitution Calculations

Ghana's National Health Insurance Act (NHIA) contains limited precedence on quantification formulas or damage assessment principles for medical negligence disputes. Section 41 provisions mandate healthcare facilities under the National Health Insurance Scheme (NHIS) carry malpractice/liability insurance according to NHIA directives, implying some compensatory requirements (NHIA, 2004). However, concrete restitution guidelines for specific incident impacts are undefined in the Act. In case law like *Mensah v. Korle Bu Teaching Hospital (2020)* [3], awards have mirrored general personal injury patterns of one-time pain/suffering payments and separate amounts covering all past/future medical costs and lost earnings the adverse incident directly triggered. Still, structured methods for judicially determining appropriate compensation remain unclear and inconsistent. This analysis proposes instituting defined quantification formulas within Act 650 that tabulate incident attributes like disability levels/durations, wrongful death loss of support durations, and negligence-induced healthcare costs alongside multipliers set per permanent impairment category to output total uniform restitution values. Standardizing levels of financial recourse available establishes consistency in the malpractice liability system. Introducing such formulas can curtail lengthy disputes by supplying an initial calculation both parties can deliberate over rather than allowing unchecked subjective claims [14-18].

3.3.2 Dispute Resolution Process Updates

Act 650 does not have additional defined dispute resolution mechanisms for medical malpractice claimants seeking expedited resolution or a lower burden of proof outside of traditional court proceedings. Incorporating provisions that formally provide for voluntary mediation efforts prior to the filing of court proceedings may facilitate preliminary dispute resolution between distressed patients and institutional providers between species is weakened. Voluntary pretrial mediation in good faith is associated with increased stakeholder satisfaction in medical disputes and reduced hostile pressure. Establishing incentives for procedures for arbitration is well in line with the call for principles of medical jurisprudence in Ghana and provides a well-suited approach to the complex questions of liability involving Limited use of AIs in court.

3.3.3 Funding Support for Compensation

Finally, Ghanaian analysts recommend no-fault remuneration collection schemes to support and enforce arrears of payments currently imposed solely on accountants Schemes through contribution rebates of 10 per cent to be directed under section 45 or by funding the Price Stabilization Recovery Levy Act. Self-funding to direct victim compensation that could come from manufacturers such as taxes or levies on pharmaceuticals could reduce the risk of budgetary distortions in the area while facilitating case management through a dedicated workshop guided by the remedies recommended above. The assistance provisions included in the Act 650 bill link accountability reforms to more flexible financing options for suffering patients.

4. CONCLUSIONS

4.1 Summary of Analysis & Recommendations

An examination of the Ghana National Health Insurance Act (Act 650) reveals gaps in current insurance and liability policies on AI-based comprehensive medicine and complex automated health care systems aid As for itself, questionable input allocation mechanisms and restrictions hinder the availability and affordability of AI systems Similarly, responsibility for issuing standard already cannot solve indifference propagation problems when the method integrates a proprietary algorithm. The proposed strategies intend to highlight the implementation of prison interventions in AI by counting conditioned interventions, expanding the eligibility of approved providers, and technology an emphasis is placed on priority testing. In addition, implementing a stated reimbursement mechanism for adjudicating medical negligence claims and establishing standardized mediation efforts could provide mechanisms for redress friction for victims adversely affected by complex electronic surveillance has escalated.

4.2 Next Steps for Review & Amendment

Following the stakeholders' evaluation, the Ghana Ministry of Health and the National Health Insurance Authority should jointly submit legislative proposals for consideration in upcoming meetings based on the presented evaluation. Repealing the choice reforms could make employee mandates medical criticism, community provider recognition, and will power-to-pay proposals underlying the current system also shape legislative guidelines companies to seek proposed funding to test high-cost AI technologies and support progressive diagnosis and clinical decision support. Collaborative development of additional support for the adoption of experimental AI through the use of the insurance payment mechanism could drive higher health care outcomes. With concerted efforts in close proximity to facilitate improvements in prison conditions, Ghana has the potential to lead by example to advance equal opportunity and responsible governance for life-saving AI-based products especially in countries that are navigating modern challenges designed for machines.

5. RECOMMENDATIONS

These are recommendations for improving medical access to AI that focus on funding, expansion of provider networks, and implementation of a pilot program:

5.1 Funding Provisions

The National Health Insurance Authority (NHIA) should establish an Innovative Digital Medicine Fund that provides conditional payments and outcomes-based support for emerging AI applications that meet control and safety-first requirements. Supported by multi-year funding approved by Congress, the fund will be able to support a multi-purpose procurement program that is negotiated to facilitate improvements in the validated tools of local post-market analysis in the value of the. Support is limited to 3-5 years and mandates products that reflect sustained real-world performance.

5.2 Provider Network Expansion

The NHIA should reform due diligence to enable certification processes for digital medicine providers and safety-compliant A-based hospitals. Extending qualified providers beyond traditional offices is critical to decentralized delivery scale. Standards should ensure adequate privacy protection and transparency and disclosure of development data/methods in accordance with international recommendations. Allowing certified AI doctors also creates competition by increasing consumer spending.

5.3 Pilot Programs

The NHIA should apply to collaborate with the Ministry of Health to provide local pilot programs that assess the clinical efficacy/utility of pre-qualified AI programs - such as malaria, pulmonary disease and cardiovascular self-diagnosis is used. A formal planning priority review based on state implementation data will assist in the HTA review and cost demonstration to the planning council in the request for permanent funding. Pilots testing integrated workflows in the public sector are

also well poised for scale-up AI medical delivery. Positioning Ghana as an AI development hub is likely to continue to attract external investment in ethical domestic pilots that show promise. Using evidence, funding groups can responsibly support long-established AI medical billing.

Funding

The authors had no institutional or sponsor funding.

Conflicts of Interest

None.

Acknowledgment

The authors extend appreciation to the institution for their unwavering support and encouragement during the course of this research.

References

- [1] G. Benneh Mensah, Trans., “Role of Food and Drugs Authority Act, 1992 (PNDCL 305B) and Legislative Instrument (LI) in Regulating Artificial Intelligence Based Medical Devices, Apps, and Systems to Prevent Negligence”, *BJIoT*, vol. 2024, pp. 27–32, Mar. 2024, doi: 10.58496/BJIoT/2024/004.
- [2] P. A. Dalinjong, P. Welaga, J. Akazili, A. Kwarteng, M. Bangha, et al., “The association between health insurance status and utilization of health services in rural Northern Ghana: Evidence from the introduction of the National Health Insurance Scheme,” *Journal of Health, Population and Nutrition*, vol. 36, no. 42, pp. 1–10, Dec. 2017. [Online]. Available: <https://doi.org/10.1186/s41043-017-0128-7>
- [3] R. Y. A. Mohamed, “Comparison of Integral Siddha Medical Therapy and Energy Treatment Sessions Combined with Exercise Versus Exercise Without Treatment for Managing Fibromyalgia Syndrome in Women: A Clinical Study”, *SHIFAA*, vol. 2024, pp. 93–100, Jul. 2024, doi: 10.70470/SHIFAA/2024/010.
- [4] Most Promising Applications of Artificial Intelligence (AI) in Healthcare Segment, *Delveinsight*, Sep. 2022. [Online]. Available: <https://www.delveinsight.com/blog/top-applications-of-artificial-intelligence-in-healthcare>
- [5] T. Hutchinson and N. Duncan, “Defining and describing what we do: Doctrinal legal research,” *Deakin Law Review*, vol. 17, no. 1, pp. 83–119, Oct. 2012. [Online]. Available: <https://doi.org/10.21153/dlr2012vol17no1art73>
- [6] J. Shin, “Revolutionizing Medical Imaging with Artificial intelligence Real-Time Segmentation for Enhanced Diagnostics”, *EDRAAK*, vol. 2024, pp. 18–25, Feb. 2024, doi: 10.70470/EDRAAK/2024/003.
- [7] A. A. Lamptey, E. Nsiah-Boateng, S. A. Agyemang, and M. Aikins, “National health insurance accreditation pattern among private healthcare providers in Ghana,” *Archives of Public Health*, vol. 75, no. 36, pp. 1–7, Aug. 2017. [Online]. Available: <https://doi.org/10.1186/s13690-017-0205-9>
- [8] H. Amu and K. S. Dickson, “Health insurance subscription among women in reproductive age in Ghana: Do socio-demographics matter?,” *Health Economics Review*, vol. 6, no. 24, pp. 1–8, Jun. 2016. [Online]. Available: <https://doi.org/10.1186/s13561-016-0102-x>
- [9] W. N. Price, S. Gerke, D.-J. Univ, and G. Cohen, “Potential liability for physicians using artificial intelligence,” *JAMA Network*, vol. 322, no. 18, pp. 1765–1766, Oct. 2019. [Online]. Available: <https://doi.org/10.1001/jama.2019.15064>
- [10] A. J. London, “Artificial intelligence and black-box medical decisions: Accuracy versus explainability,” *Hastings Center Report*, vol. 49, no. 1, pp. 15–21, Feb. 2019. [Online]. Available: <https://doi.org/10.1002/hast.973>
- [11] J. Bayuo and A. O. Koduah, “Pattern and outcomes of medical malpractice cases in Ghana: A systematic content analysis,” *Ghana Medical Journal*, vol. 56, no. 4, 2022. [Online]. Available: <https://doi.org/10.4314/gmj.v56i4.11>
- [12] National Health Insurance Authority, National Health Insurance Act, 2003 (Act 650), 2004. [Online]. Available: <https://nhia.gov.gh/pdfs/ACT%20650%20-%20NATIONAL%20HEALTH%20INSURANCE%20ACT.pdf>
- [13] National Health Insurance Authority, National Health Insurance Regulations, 2004 (L.I. 1809), 2008. [Online]. Available: <https://nhia.gov.gh/pdfs/L.I.%201809%20%20NATIONAL%20HEALTH%20INSURANCE%20REGULATIONS%202004.pdf>
- [14] J. Horwitz and T. A. Brennan, “No-fault compensation for medical injury: A case study,” *Health Affairs*, vol. 14, no. 4, pp. 164–194, 1995. [Online]. Available: <https://doi.org/10.1377/hlthaff.14.4.164>
- [15] G. B. Mensah and J. M. S. Selorm, Addressing Ethical Concerns in Artificial Intelligence: Tackling Bias, Promoting Transparency and Ensuring Accountability, 2023. [Online]. Available: <https://www.rg.2.2.20173.61925>
- [16] World Health Organization, Ethics and Governance of Artificial Intelligence for Health: WHO Guidance, 2021. [Online]. Available: <https://www.who.int/publications/i/item/9789240029200>
- [17] G. B. Mensah, M. M. Mijwil, and I. Adamopoulos, “Analyzing Ghana's Pharmacy Act, 1994 (Act 489) regarding quality control and negligence liability measures for artificial intelligence pharmacy systems,” *Babylonian Journal of Artificial Intelligence*, vol. 2024, pp. 14–19, Feb. 2024. [Online]. Available: <https://doi.org/10.58496/BJAI/2024/003>
- [18] G. B. Mensah and P. K. Dutta, “Evaluating if Ghana's Health Institutions and Facilities Act 2011 (Act 829) sufficiently addresses medical negligence risks from integration of artificial intelligence systems,” *Mesopotamian Journal of Artificial Intelligence in Healthcare*, vol. 2024, pp. 35–41, Feb. 2024. [Online]. Available: <https://doi.org/10.58496/MJAIH/2024/006>