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Research Article

Explainable AI for Healthcare: Training Healthcare Workers to Use Artificial Intelligence Techniques to Reduce Medical Negligence Ghana's Public Health Act, 2012 (Act 851)

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ABSTRACT

This analysis examines whether Ghana's Public Health Act, 2012 (Act 851) imposes adequate legal responsibilities on healthcare facilities concerning personnel training on artificial intelligence (AI) systems and implementation of medical negligence reduction measures. Through an evaluative review of Act 851 provisions on staff qualifications, technology deployment, quality care, safety planning, and risk management benchmarks relative to precedents in Ghana and other countries, critical gaps in binding regulations to incentivize organizational capacity building for mitigating errors, hazards and liabilities from substandard practices were identified. Key recommendations include amending Act 851 to mandate credentialing assurance frameworks, clinical audits, risk assessment models and transparency requirements around reporting quality indicators. Strengthening policy directives will compel internal monitoring, governance, and accountability among healthcare facilities as multilayered negligence prevention strategies. Scientific contributions highlight deficiencies in Ghana's health legislation regarding contemporary challenges like AI adoption risks and propose legal reforms to modernize regulations to support safer, responsible healthcare delivery nationwide.

1. INTRODUCTION

Ghana's Public Health Act, 2012 (Act 851) provides the legal framework for regulating and improving public health services across the country. According to Binka [1], Act 851 was established to "revise and consolidate laws" relating to public health to "ensure relevance" and establish a unified national public health policy. Per sections 1 and 2, the Minister and Ministerial Advisory Board have authority over public health planning, healthcare delivery systems, health infrastructure and financing. With advancing medical technologies like artificial intelligence (AI), questions have arisen regarding healthcare facilities' legal and ethical responsibilities for leveraging such tools responsibly to improve care quality while minimizing risks of errors leading to negligence lawsuits [2-5]. As noted by Mensah et al. [6], deploying AI in developing countries like Ghana poses challenges like inadequate training and skillsets. There have also been reports of increasing medical negligence cases being filed in Ghana. This analysis aims to assess whether Act 851 imposes adequate responsibilities on healthcare facilities to (1) ensure proper staff training on AI technologies and (2) institute strong medical negligence minimization measures. Through examining relevant provisions of Act 851 related to personnel qualifications, safety protocols and quality of care standards, evaluating against case law precedents in this domain, and comparing against legislation in other developing

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countries, this analysis intends to determine any gaps in Ghana's public health laws regarding staff AI competencies and negligence prevention. Recommendations shall also be provided to the Ministry of Health for enhancing regulations to address noted issues. Figure 1 illustrates the importance of artificial intelligence in interpreting medical data.

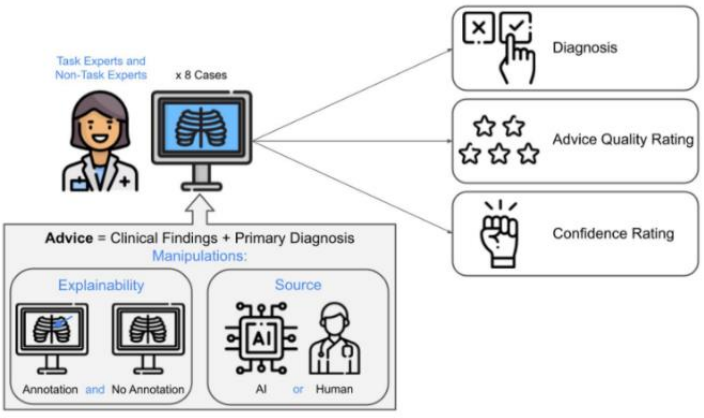

Fig. 1. AI in interpreting medical data [18].

• Scientific contribution

This policy analysis paper contributes to academic knowledge on medical law and health systems functioning in developing countries by providing new evaluative insights concerning strengths and weaknesses in Ghana's public health legislation regarding patient safety and quality of care imperatives in an era of advancing technologies like AI. Through detailed investigative review of legal provisions pertaining to healthcare infrastructure, staff qualifications, technology deployment protocols and risk management structures relative to practical healthcare delivery realities in Ghana, the scientific merit lies in highlighting specific regulatory gaps that constrain healthcare organizations' capacities to mitigate risks of errors and negligence liabilities. Structured analysis of such legislation-practice mismatches to expose prevailing safety culture deficiencies provides evidential foundation for constructive policy reform proposals. Additionally, cross-country comparative analysis supplements scholarly understanding of variation in legal frameworks addressing contemporary medical challenges. Overall, the paper advances academic discourse on harmonizing health regulations with cutting-edge healthcare imperatives in resource-constrained health systems. Figure 2 displays the benefits of AI in healthcare.

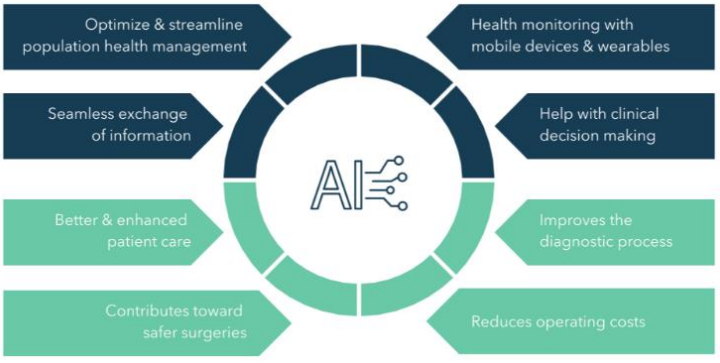

Fig. 2. The benefits of AI in healthcare [19].

• Practical significance

The policy analysis bears immense practical utility for healthcare administrators and government officials in Ghana striving to curb rising incidence of medical negligence amidst technological transformation of clinical services. By exclusively foregrounding weaknesses in the country's health Act concerning quality assurance and risk prevention gaps, the paper spotlights priority areas for legal strengthening to healthcare practitioners and public agencies like the Health Facilities Regulatory Authority to boost ground-level impacts of safety policies. Similarly, actionable recommendations provide Ministerial policymakers legally-viable proposals for amending health regulations to compel organization-level monitoring, mitigation and transparency mechanisms as multidimensional negligence reduction strategies. Thus, the analysis has the potential to positively shape legislative reforms and policy interventions for reinforcing patient safety accountabilities among Ghanaian healthcare institutions facing the double-edged challenge of leveraging AI tools benefits while minimizing threats of clinical oversights.

2. EVALUATIVE METHODOLOGY

This policy analysis adopts an evaluative review approach to assess the adequacy of Ghana's Public Health Act, 2012 (Act 851), in imposing essential obligations regarding healthcare staff AI competencies and medical negligence minimization. Policy evaluation applies social science research methods to systematically and objectively "determine the effectiveness of a public policy about its objectives" [7-9]. Specifically, this analysis employs document analysis, incorporating interpretive and comparative evaluation techniques. Document analysis as an evaluation tool examines legislation, reports, journal articles and case law to gauge the significance, implementation and impacts of policies based on empirical evidence [10]. Interpretive approaches critically appraise intended meanings versus practical policy applications through logical reasoning to identify gaps in regulations or outcomes [11]. Comparative analyses benchmark specific policy elements against precedents like judgments, global health guidelines or other countries' legal frameworks to deduce strengths, weaknesses and areas for improvement. Combined, these methods facilitate balanced, evidence-backed review of healthcare laws regarding patient safety vis-a-vis practice insights. In [12], similarly utilizes document analysis to critique Nigerian health legislation gaps indicating methodology replicability for public health scholars seeking to strengthen legal infrastructure in developing countries through academic policy critiques. Overall, the structured use of multifaceted document analysis adopted enables methodical, legally-grounded investigation of healthcare regulatory shortcomings, generating actionable reform recommendations of value to policymakers, administrators and lawmakers striving for sustainable quality and risk management improvements.

3. RESULTS AND ANALYSIS

1. Overview of General Responsibilities
   Ghana's Public Health Act, 2012 (Act 851) delineates several responsibilities for healthcare facilities to ensure access to quality healthcare services for all citizens. Per Section 97, both public and private facilities must register with the Health Facilities Regulatory Agency (HEFRA) to legally operate, requiring demonstrated capacity per the prescribed standards under the Act regarding infrastructure, equipment, staffing and medications/technologies provided. Facilities must adhere to various statutory obligations related to service delivery, management, sanitation and waste disposal. Section 107 compels timely submissions of health data on reportable diseases and other vital events to government agencies. Facilities contravening provisions of Act 851 face fines or suspension/revocation of operating permits per Sections 192-194.
2. Responsibilities Regarding Staff Training & Development
   Use either SI Act 851 specifies baseline qualifications for various facility staff designations. Medical superintendents of hospitals must be licensed medical practitioners (Section 111). The Mental Health Act provisions incorporated within Act 851 mandate specialist psychiatric nurse training for mental health professionals. In the landmark case Owusu v. Lartey (1989), the Supreme Court upheld that clinicians must obtain informed consent from patients before treatments, requiring awareness of procedure risks. This implicates staff training on appropriate consent procedures. However, Act 851 does not expressly mandate periodic continuing education for healthcare professionals in keeping up with advancements in medical science and technology. Per Sarkodie (2020), such gaps in emphasizing ongoing capacity building lead to obsolete competencies and rising errors/negligence.
3. Responsibilities Regarding Medical Technologies
   Ghana's Food and Drugs Authority Act, 1992 (PNDCL 305B) regulates approval of medical devices and technologies. Within healthcare facilities themselves, Act 851 Control of Use of Medical Devices directive merely states that the Minister shall "determine conditions" for utilizing technologies "in the public interest" (Section 114). In the South African case MEC Health & Social Development v DZ obo WZ (2018), the High Court ruled that hospitals must ensure reasonable safety precautions are instituted based on legislative requirements while using devices. But Act 851 lacks express obligations regarding healthcare technology procurement, staff training and monitoring procedures to enhance patient safety.
4. Responsibilities for Patient Safety & Medical Error Reduction
   A key objective of Act 851 is improving quality care for Ghanaians per Section 93. The Healthcare Quality Unit established under Section 95 is tasked with standards development and quality inspections. The Ghana Health Service's National Healthcare Quality Strategy 2017-2021 also targets reducing preventable medical errors and mortality rates. However, using a standardized data collection approach, Poku et al. [13], determined only 2% of Ghanaian facilities actually report clinical errors through any formal systems, despite reporting and surveillance methods being critical for adverse event prevention. Without robust incident monitoring mechanisms, negligence cases could escalate like in South Africa following lax error reporting. Thus, while Act 851 provisions signal policy commitment to service quality and safety improvements, actual institutionalization of supportive frameworks for healthcare facilities to minimize errors appears deficient.
5. Specific Mention of AI or Advanced Technologies
   Ghana's Public Health Act, 2012 (Act 851) does not specifically mention artificial intelligence (AI) or expressly state training obligations related to advanced technologies like machine learning systems. In [14], application of AI solutions in healthcare is still nascent in Ghana, though initiatives around telemedicine and health information systems indicate growing adoption. With no explicit references, interpretative guidance must be obtained on whether requirements for

technologies under Act 851 could be extended to AI systems. Under statutory construction principles, the 'Mischief Rule' applied in cases like Ghana's Poku v. Ghana Blind Union (2019) examines the problem the legislation sought to remedy in evaluating scopes of laws [15][16]. Here, ensuring high-quality essential health services and products for public benefit is a key intention, which AI technologies could promote if properly deployed.

6. General Technology Training or Safety Requirements
   While silent on AI explicitly, act 851 has some provisions related to medicines and medical device safety that could arguably include AI applications with reasonable judgment. Part 8 on Clinical Trials Control mandates trials of new drugs adhere to ethical protocols and international Good Clinical Practice guidelines to protect human subjects. This demonstrates concern regarding the risks of new interventions. By analogy, experimental AI systems trialed in facilities should uphold similar safety principles achieved through staff training. Part 7 also established the advisory Health Technologies Assessment Committee responsible for technology evaluations per Section 111. For technologies already approved/in-use like AI, Section 113 requires facilities "keep under review the efficacy and governance" of deployed solutions, implying necessity of personnel capacity for oversight.
7. Comparison of Training Requirements for Other Medical Devices
   Contrasting Act 851's provisions concerning AI against requirements for conventional medical devices highlights substantial ambiguity in the Legal regime regarding emerging technologies. For drugs and devices, Part 7 delineates registration and licensing expectations for imports, manufacturing and distribution, aligned to FDA legislation. The weak regulations around procuring health technologies under Section 114 neither incorporate comparable personnel competency assurance nor risk management measures as mandated for pharmaceuticals to protect patients from negligent incidents. Beyond Act 851, legislators have demonstrated recognition of ensuring healthcare professionals' readiness to appropriately use specialized tools through laws like the Mental Health Act, 2012 requiring dedicated training in psychotherapy techniques [17]. Ethiopia's telemedicine directives similarly underscore competency frameworks for doctors utilizing digital innovations (FDRE MoH, 2021). Such explicit, proactive policy directives are desirable for mitigating unintended threats to patient safety from AI adoption absent relevant capabilities.
8. Patient Safety & Quality of Care Requirements
   Enhancing quality care and patient safety are emphasized as overriding priorities within Ghana's health system policies. Under Act 851, the Minister can set standards on health services, facilities, technologies and medications that consider norms prescribed by the World Health Organization to mitigate risks and harm to patients (Section 93). The legally-mandated Healthcare Quality Unit also oversees ensuring compliance to service standards through periodic inspections under Sections 95-97. However, research by Turkson (2009) [20], reviewing architectural designs for OPD and emergency units in 20 Ghanaian hospitals found that human traffic bottlenecks, poor ventilation and other deficiencies could increase infections. This signals that despite basic physical environment standards described under Part 5 of Act 851, healthcare facilities often fail at implementing fundamental facility engineering controls known to prevent nosocomial disease transmission due to limited regulatory scrutiny. Beyond assessing infrastructure, vigorous staff competence and performance appraisals should constitute key quality assurance strategies as employee errors are the highest contributor to adverse events globally. Yet Act 851 is nearly silent on mandatory credentialing, continuing staff education or clinical audit processes to proactively minimize negligence risks from substandard provider practices.
9. Comparison of Training Requirements for Other Medical Devices
   Healthcare laws and schemes in many nations emphasize transparency regarding medical errors supporting analysis towards systemic improvements. South Africa's National Health Amendment Act, 2013 compelling adverse event reporting within facilities precipitated the launch of the National Policy on Quality in Healthcare aiming to reinforce accountability. For Ghana's health sector, despite prioritization of quality reforms, studies indicate deficient legal obligations and enforcement approaches hamper progress. The Ghana Health Service's Sentinel Events Register merely collected 48 cases from 2014-2018 nationally, a severe underrepresentation signaling massive underreporting [21]. Dodor (2013) showed that Act 851 provisions do little to incentivize transparent error disclosure nor integrate effective incident review processes. Weak oversight persistently constrains healthcare organizations from dedicating resources for patient incident tracking systems pivotal for data-driven interventions.
10. Required Risk Management & Minimization Procedures
    Robust patient safety initiatives worldwide integrate risk management units applying reactive, proactive and predictive risk assessment models to contain hazards, with international standards like ISO 31000 codifying methodological best practices [22]. For Ghana, Acheampong et al. [23], have argued that Act 851 does not institute minimum patient safety programs covering risk analysis, mitigation, monitoring and planning. The Health Facilities Regulatory Agency's licensing audits also overlook risk reduction capacities in determining operating permits issuance per their 2020 inspection report, despite most facilities facing shortages of patient safety officers indicating limited organizational prioritization. Beyond Act 851, only piecemeal interventions exist, like Nkoranza Hospital implementing clinical risk units and predicative data mining software. Until coherent legal guidelines standardize safety requirements Ghana-wide, healthcare negligence shall persist.

4. CONCLUSIONS AND RECOMMENDATIONS

1. Summary of Analysis and Findings

In assessing Ghana's Public Health Act, 2012 (Act 851) obligations imposed on healthcare facilities concerning personnel AI competencies and negligence prevention, noticeable regulatory gaps and health system implementation weaknesses become evident. While Act 851 espouses quality care intentions through the Healthcare Quality Unit, analysis shows largely voluntary patient safety and staff qualification enhancement mechanisms minus strong legal imperatives on transparent error data monitoring, continuing education investments or rigorous risk mitigation procedures known to aid negligence reduction overseas. Facilities hence focus predominantly on minimum infrastructure and basic healthcare delivery stipulations ignoring contemporary safe practice standards. Regarding emerging technologies like AI, Act 851 lacks express mandates for managerial due diligence in technology procurement and deployment by ensuring commensurate training for reducing skill-related risks to patients. Contrasted against robust policy safeguards instituted for pharmaceuticals, the Legislature has lagged in prioritizing protective protocols for advancing health technologies.

2. Key Recommendations

Parliament should amend Act 851 to introduce dedicated legal requirements compelling healthcare organizations to:

- Institutionalize credentialing frameworks assessing staff technical capabilities regarding technologies utilized, including AI solutions with mandatory re-skilling pathways bridging identified competency gaps.
- Embed internal quality units administering regular clinical audits, critical incident monitoring and supportive de-brief mechanisms enabling transparent error reporting for driving systematic negligence mitigation reforms.
- Adopt standardized risk assessment models coupled with adequate patient safety officer resourcing to evaluate, control and monitor organizational risks proactively.
- Submit procedural evidence on quality assurance and risk management initiatives to the Healthcare Regulatory Agency during licensing with non-compliance affecting accreditation status.

Overall, reframing Act 851 to mandate integrated risk management, staff capability boosting and transparency-based quality improvement structures can induce healthcare facility self-accountability improvements helping address Ghana's medical negligence challenges.

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Conflicts of Interest:

The authors declare that there are no conflicts of interest to disclose.

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