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Application of Artificial Intelligence in Medical Diagnostics: Applications and Implications in the Healthcare Sector

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Abstract

Artificial Intelligence (AI) has emerged as a transformative innovation in the medical diagnostic sector. This study explores the application and implications of AI in healthcare services at RSUD Dr. H. Abdul Moeloek, Bandar Lampung. Using a qualitative case study method, data were obtained through in-depth interviews and participatory observation. The results show that AI contributes significantly to improving diagnostic accuracy and speed, particularly in radiological imaging. However, limitations in technological infrastructure and system integration were found to hinder its optimal use. Furthermore, the readiness of human resources remains a critical factor. Although there is optimism among medical staff, a lack of technical training has led to gaps in understanding and utilization. Ethical and legal concerns also emerged, especially regarding responsibility in case of misdiagnosis and the protection of patient data. The absence of specific regulations and digital ethics protocols presents a major barrier to AI adoption. This research concludes that while the implementation of AI in medical diagnostics shows promising outcomes, it still faces institutional and regulatory challenges. Strengthening digital literacy among healthcare workers, developing standard operating procedures, and building a secure infrastructure are essential. Collaboration between hospitals, academic institutions, and government bodies is needed to create an inclusive and ethical AI-based healthcare ecosystem.

Keywords: *Artificial Intelligence, Medical Diagnostics, Digital Ethics, Health Infrastructure.*

1. Introduction

The development of Artificial Intelligence (AI) technology has revolutionized various sectors, including healthcare, one of the most sensitive fields to innovation. Globally, AI has been widely applied in diagnostic processes, patient management, and clinical decision-making, showing promising results in improving diagnostic accuracy and healthcare service efficiency [1]. AI-based digital transformation has become an integral part of modern healthcare systems to address challenges such as medical staff workload and the high public demand for fast and accurate services. In this context, AI not only functions as a supporting tool but also as a partner in complex diagnostic processes.

The application of AI in medical diagnostics includes various technologies such as machine learning, deep learning, and computer vision, which are used to detect abnormalities in medical images such as MRI, CT scans, and X-rays. A study by Shen et al. revealed that deep learning algorithms perform on par with, or even surpass, radiologists in detecting lung diseases from X-ray results [2]. This advantage highlights the great potential of AI in assisting faster and more efficient diagnoses, especially in hospitals with high patient volumes. However, integrating this technology into conventional healthcare systems still requires further study, particularly in regional public hospitals.

In Indonesia, the implementation of AI in healthcare is still at an early stage, with limited adoption in large hospitals in metropolitan cities. Nevertheless, the demand for this technology continues to grow due to the strain on the healthcare system from rising non-communicable diseases and the lack of specialist doctors in remote areas. Research shows that AI can serve as an alternative solution for early detection of chronic diseases, though few provincial hospitals have fully integrated such systems [3]. This reflects a gap between AI's potential and its actual application in Indonesia's medical sector, including in Lampung Province.

Dr. H. Abdul Moeloek Regional General Hospital (RSUDAM), as the main referral hospital in Lampung, holds a strategic position in exploring AI utilization to enhance the quality of medical diagnostics. The hospital serves thousands of patients monthly and requires high diagnostic efficiency and accuracy. As digital healthcare services have been initiated, integrating AI becomes a logical next step to drive innovation. However, few

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studies have examined the readiness, challenges, and implications of AI adoption in regional public hospitals like RSUDAM. This creates an important research gap to explore in support of digital transformation in Lampung's health sector.

Beyond the technological aspect, AI application in medical diagnostics also raises ethical, legal, and patient data security issues that must be addressed seriously. The use of non-transparent AI systems in medical decision-making may reduce patients' trust in healthcare services. According to research, implementing AI in health must be accompanied by strict ethical guidelines and regulations to ensure the protection of patient rights [4]. This is particularly important in public hospitals, where service delivery must remain rooted in principles of justice, accountability, and safety. Therefore, it is necessary to assess how regional health institutions like RSUDAM are prepared to face these challenges.

Despite the promising potential of AI in medical diagnosis, its adoption in public hospitals like RSUDAM still faces structural and organizational culture challenges. Studies have revealed that resistance to change and limited staff training are major barriers to AI implementation in hospitals [5]. In Indonesia, this is exacerbated by disparities in technology access, lack of digital infrastructure investment, and limited regional budgets to support healthcare innovation. Thus, developing human resource digital capacity is essential to ensure successful AI integration into healthcare systems.

Government policy also plays a crucial role in accelerating or hindering AI adoption in the health sector. At the national level, the Ministry of Health has begun promoting digital service transformation programs, but has yet to specifically regulate AI use in clinical diagnosis. Scholars emphasize the importance of proactive policy support, especially in terms of regulation, technological investment incentives, and cross-sector collaboration [6]. At the provincial level in Lampung, there are no specific operational guidelines for implementing medical AI in public hospitals. This indicates the need for synergy between national regulations and local policies to ensure responsible and sustainable technology implementation.

From a technical standpoint, the success of AI in supporting diagnosis depends heavily on the quality and integration of electronic medical records (EMR). A robust EMR system provides high-quality data to train and operate AI algorithms accurately. However, many regional hospitals still use non-standardized or fragmented EMR systems. This lack of uniformity and system readiness poses a major barrier to clinical data-driven AI adoption [7]. As a type B hospital, RSUDAM must evaluate its information systems to ensure readiness for AI solutions that rely on data interoperability.

Furthermore, integrating AI into diagnostic processes raises concerns about accountability and clinical decision-making. Who is responsible if the AI system makes an incorrect diagnosis? This is crucial as it pertains to patient safety and the integrity of the medical profession. It is argued that AI-based medical decisions must remain under the supervision of medical professionals and should not be the sole basis for clinical decisions [8]. Therefore, this study will explore how physicians at RSUDAM perceive and respond to AI, and how clinical oversight mechanisms are implemented in the use of AI in public hospitals.

From the user's perspective, especially patients, AI use in diagnostic services generates diverse perceptions. Some studies suggest that while some patients welcome modern technology in healthcare, others express doubts about machine accuracy and fear the loss of human touch in medical practice. Patients tend to trust human diagnoses more than machine-generated ones, despite data suggesting otherwise [9]. As RSUDAM is a public hospital, building patients' digital literacy and trust in technology is vital for successful AI-driven transformation. Hence, this study will also evaluate patient perceptions of AI use in medical diagnosis.

Given the complexity of Indonesia's healthcare system, AI implementation requires a collaborative approach among healthcare institutions, technology providers, and academic institutions. Universities such as the University of Bandar Lampung play a significant role in supporting health tech research. Research and community engagement based on digital technology can accelerate AI adoption in medical services, particularly through medical staff training and data-based policy analysis [10].

In addition, effective AI implementation depends on a human-centered approach that places patients and medical personnel at the core of innovation. AI systems designed without considering end-user needs risk resistance and implementation failure. Studies stress that medical AI technology must be complementary rather than a replacement for human roles [11]. Therefore, hospitals like RSUDAM must design AI strategies that incorporate input from all stakeholders doctors, patients, and administrative staff to build adaptive and sustainable services.

Information technology system readiness is also a key component of successful AI implementation. A strong, interoperable, and secure hospital information system will support AI integration in diagnosis and clinical decision-making. Many failures in healthcare AI implementation stem from weak digital infrastructure foundations [12]. Hence, assessing the system readiness at RSUDAM including data security, inter-department integration, and IT system sustainability is necessary to support clinical AI.

Beyond technical and ethical factors, the benefits of AI in diagnostics must also be evaluated in terms of clinical outcomes and cost efficiency. A study has shown that AI implementation in dermatology can reduce costs and significantly improve skin cancer detection accuracy [13]. Similar evaluations are needed in the local context of

Bandar Lampung to determine whether AI truly optimizes the allocation of regional health resources. Therefore, a case study approach at RSUDAM is strategic in uncovering the practical and economic implications of AI use in healthcare services.

Based on the discussion above, this study aims to explore how AI is applied in medical diagnostic processes at Dr. H. Abdul Moeloek Hospital and examine its implications on service quality, operational efficiency, and ethical challenges. It also seeks to fill the literature gap on AI adoption in regional hospitals, which remains understudied. The findings are expected to provide input for policymakers and healthcare institutions in formulating inclusive, safe, and sustainable digital strategies. The University of Bandar Lampung is expected to be a catalyst for tech-based research supporting healthcare system transformation in Lampung Province.

2. Research Methods

This study employs a descriptive qualitative approach aimed at providing an in-depth portrayal of the phenomenon of Artificial Intelligence (AI) implementation in the medical diagnostic process at Dr. H. Abdul Moeloek Regional General Hospital (RSUDAM), Bandar Lampung. This approach is chosen to explore the experiences, perceptions, and social dynamics emerging from the use of AI technology within a public hospital setting. Descriptive qualitative research allows for comprehensive data collection regarding the context, challenges, and impact of the technology on clinical practice, hospital organization, and patient interaction.

The research site is determined to be RSUD Dr. H. Abdul Moeloek (RSUDAM), which serves as the main referral hospital in Lampung Province. The selection of this location is based on its ongoing digital transformation initiatives in healthcare services, including the use of hospital information systems and electronic medical records foundational elements for AI integration. Furthermore, its status as a type B hospital with various specialist services provides an appropriate contextual backdrop to examine AI technology implementation in diagnosis systems and clinical decision-making at the regional level.

Participants in this study are selected using purposive sampling, targeting individuals with relevant knowledge and experience related to the research topic. Informants include medical specialists (particularly radiologists and internists), hospital IT experts, medical information system managers, and patients who have used digital diagnostic services. Where possible, representatives from the Lampung Provincial Health Office will also be involved to gain insights into health policy and long-term planning regarding digital health transformation.

Data collection is conducted using three primary methods. First, in-depth semi-structured interviews are carried out with each informant, guided by an interview protocol aligned with the research focus. Second, participant observation is undertaken to examine the diagnostic service workflow in the hospital, especially the use of digital tools related to AI. Third, document analysis is conducted on hospital information systems, service reports, and technological data related to AI-based medical diagnosis.

The data collected is analyzed using thematic analysis, involving stages of data reduction, categorization, and conclusion drawing. The initial step includes transcribing interviews and recording observation results, followed by coding to identify emerging key themes. These themes are grouped into categories such as effectiveness, efficiency, implementation barriers, medical personnel perceptions, and ethical and data security concerns. The findings are presented in descriptive narrative form, supported by direct quotations from informants to strengthen the validity of the results.

To ensure data trustworthiness, source and technique triangulation are applied. Source triangulation is carried out by comparing information obtained from informants with different backgrounds, while technique triangulation combines data from interviews, observations, and documentation. Additionally, member checking is conducted with several key informants to confirm that the researcher's interpretation accurately reflects their experiences and viewpoints. With these strategies, the study aims to present a comprehensive and accurate reality of AI implementation in medical diagnostics at RSUDAM Bandar Lampung.

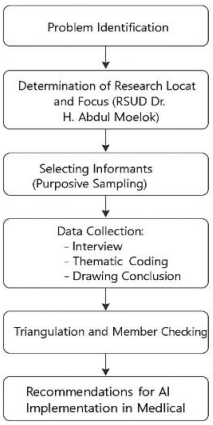

Figure 1. Research Flow Implementation of AI in Medical Diagnostic in RSUDA

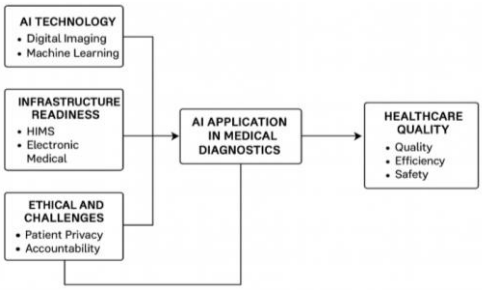

Figure 2. AI implementation in medical diagnostics at RSUDAM Bandar Lampung.

In addition to technical aspects, human factors and regulations also influence the effectiveness of AI adoption in medical diagnosis. Healthcare professionals' perceptions of AI, such as trust and skill readiness, play a major role in determining the extent to which this technology can be integrated into clinical practice. On the other hand, ethical and regulatory challenges such as patient data privacy issues and accountability for clinical decisions can become obstacles if not anticipated from the outset. All these elements contribute to the overall outcome of AI implementation, whether in terms of improving service quality, enhancing operational efficiency, or ensuring patient safety. By understanding the interaction of these factors, this study is expected to contribute to the development of a sustainable and ethical digital healthcare system.

3. Results and Discussion

3.1. Results

Table 2. Data Collection Results: Participatory Observation

Informant	Key Findings	Additional Information
Specialist Doctor (Radiology)	AI helps speed up the process of identifying abnormalities in X-ray and CT scan images; diagnosis is ±30% faster than manual	The final decision remains with the doctor; AI as a tool, not a substitute for clinicians
Hospital IT Personnel	AI systems have limited integration with electronic medical record (EMR) systems; additional training is needed for system optimization	There are still constraints on servers and data connections between systems
SIMRS Manager	SIMRS supports the use of AI, but technical and budgetary limitations hinder the widespread expansion of AI use across diagnostic units	Integration has not been evenly distributed to all supporting services

Table 2. Data Collection Results: Semi-Structured Interview

Observation Area	Observed Activities	Interpretation
Radiology Unit	The scanning process is carried out by digital imaging, the image results are directly sent to the system for AI analysis	Workflow is semi-automated, but interpretation still awaits manual doctor validation
Counter and Medical Records Unit	The integration between AI and SIMRS system is not yet fully synchronized (e.g. AI results are not automatically entered into EMR records)	There are manual input pauses that risk increasing administrative errors
Server and IT Room	The system runs with limited internal hospital server support and does not have redundant backups.	System performance is vulnerable to overload and risk of data loss if not upgraded

The results of the semi-structured interviews revealed that medical personnel and information system managers at RSUDAM demonstrated a generally positive initial understanding of the use of Artificial Intelligence (AI) in supporting diagnostic processes. A radiology specialist stated that AI has helped accelerate the analysis of medical images such as X-rays and CT scans, reducing the time required by up to 30% compared to manual processes. However, AI has not yet become the primary decision-making tool, as the final validation remains the responsibility of the physician. Meanwhile, hospital IT staff explained that AI integration with the electronic medical record (EMR) system has begun to be implemented, though not optimally, due to limited server capacity and a lack of advanced technical training. The hospital information system manager also revealed that budget constraints and limited technical support hinder the broader implementation of AI across other units.

Participant observations conducted in various service units indicated that diagnostic workflows have begun shifting toward more systematic digitalization. In the radiology unit, digital scan results are directly sent to a system connected to AI-based software for preliminary analysis. Nevertheless, the final interpretation is still confirmed by physicians using conventional methods. In the medical records unit, AI-generated results are not yet automatically integrated with the EMR, requiring manual input that may lead to data inconsistencies. Furthermore, the condition of the servers and the IT control room highlighted limitations in digital infrastructure, particularly in redundancy and system backup, which could hinder the long-term operational reliability of AI. These findings indicate that the effectiveness of AI heavily depends on the readiness of supporting systems and interconnectivity among units.

3.2. Discussion

3.2.1. Effectiveness of AI Implementation in Diagnostic Processes

The implementation of Artificial Intelligence (AI) in medical diagnostic processes at Dr. H. Abdul Moeloek Regional General Hospital (RSUDAM) demonstrates a significant contribution to improving service efficiency, particularly in radiology and chronic diseases such as tuberculosis. Based on interviews with medical specialists, AI technology has been utilized as a support tool to analyze medical imaging results (X-ray and CT scans), thereby accelerating the identification of tissue abnormalities. Medical personnel reported that AI can highlight areas in images potentially showing abnormalities within a short time, a process that previously required longer manual analysis. This directly impacts reducing the waiting time for diagnostic results.

The effectiveness of AI is also evident in improving diagnostic accuracy for certain cases. Studies have shown that deep learning is capable of classifying radiological results with accuracy levels equal to or better than human radiologists [14]. At RSUDAM, doctors noted that AI serves as an initial reference for clinical decision-making, though the final decision remains under the physician's authority. This collaborative approach between technology and medical personnel creates a more reliable diagnostic mechanism and reduces the risk of human error, particularly in cases with similar symptoms.

However, the effectiveness of AI in practice also depends on the quality of data used. Doctors and IT staff at RSUDAM revealed that some algorithms still require retraining to align with local patient data and conditions, as most AI software is based on foreign patient datasets. Research confirms that AI models not developed with local data risk bias and reduced accuracy in different populations [13]. Therefore, AI integration must be accompanied by system updates with datasets representative of the local population.

In addition, AI effectiveness is influenced by workflow and hospital system integration. Although RSUDAM already uses digital medical information systems, limited interoperability between diagnostic tools, electronic medical records (EMR), and AI platforms remains an obstacle to comprehensive AI utilization. Previous findings emphasized the importance of system integration to ensure that AI outputs are directly recorded into patient medical records and connected with clinical decision-making systems [15]. Thus, the success of AI implementation is determined not only by algorithms but also by the readiness of supporting systems.

Overall, the effectiveness of AI implementation at RSUDAM can be seen through time efficiency, improved early diagnostic accuracy, and support for physicians' clinical decisions. However, these results remain partial and depend on system limitations, data quality, and human resource readiness. The full integration of AI into hospital systems is still in progress and requires synergy between technological innovation and operational adaptation. With strengthened infrastructure capacity and medical staff training, AI has great potential to become a key element in modernizing diagnostic services in regional hospitals.

3.2.2. Readiness of Technological Infrastructure at RSUDAM

The implementation of Artificial Intelligence (AI) in medical diagnostics cannot be optimized without adequate technological infrastructure. Observations and interviews at RSUDAM revealed that the hospital already has a Hospital Management Information System (SIMRS) and an Electronic Medical Record (EMR) system, which form the foundation for clinical data integration. However, these systems have not yet fully supported the automatic operation of AI software due to limitations in interoperability, network speed, and server storage

capacity. This indicates that RSUDAM's technological readiness is still at an early stage of digital adoption, not yet reaching the level of full integration needed for real-time AI utilization.

One of the main obstacles faced by RSUDAM is the limited capacity of internal servers and the absence of stable data redundancy or backup systems. According to hospital IT staff, the current AI system can only operate on a limited basis since the high data processing load exceeds existing infrastructure capacity. Scholars affirm that the success of AI in healthcare systems largely depends on strong computing capacity, cloud system availability, and reliable data security [16]. The lack of these elements at RSUDAM suggests that the hospital still needs to strengthen its technological foundation to ensure AI can function optimally, supporting automatic and safe medical decision-making.

Beyond technical infrastructure, information system management is also a challenge. Observations indicated that service units still operate with standalone systems that are not fully connected to the central server. As a result, AI analysis results are not directly stored in the EMR and must be manually inputted by staff, increasing the risk of data inconsistencies. This is consistent with research findings that hospital information system fragmentation poses a serious barrier to AI-based digital health services [17]. Therefore, strengthening system integration and inter-division connectivity is a crucial step in driving comprehensive digital transformation.

Infrastructure readiness also encompasses data security and patient medical information protection. RSUDAM does not yet have a specific cybersecurity system to regulate the data flows processed by AI, despite the high sensitivity and vulnerability of medical data to breaches. Research highlights that AI systems in healthcare must be built with a privacy-by-design principle and equipped with strict access controls [18]. Without these protections, AI implementation risks ethical and legal violations, ultimately undermining user trust in hospital digital systems.

Overall, RSUDAM's technological infrastructure readiness to support AI implementation is still in the development stage, with significant potential that can be optimized through technology investment, system integration, and enhanced data security. The hospital has begun its digital transformation with SIMRS and EMR foundations, but it requires advanced computing systems and additional supporting infrastructure for comprehensive AI functionality. These improvement efforts must involve collaboration among hospital management, local government, and academic institutions such as the University of Bandar Lampung to develop a sustainable regional healthcare digitalization strategy.

Figure 3. Activities in the Radiology Control Room at Dr. H. Abdul Moeloek Regional General Hospital

3.2.3. Perceptions and Competence of Medical Personnel Toward AI

The perceptions and competence of medical personnel play a central role in determining the success of Artificial Intelligence (AI) implementation in healthcare services. Based on interviews with doctors and paramedics at Dr. H. Abdul Moeloek Regional General Hospital (RSUDAM), most medical staff welcomed AI as a diagnostic support tool. They noted that AI could improve work efficiency and assist in interpreting complex medical imaging results. However, some remained skeptical, particularly concerning the system's accuracy and the potential displacement of human roles in clinical decision-making.

Such skepticism generally arises from limited understanding of AI mechanisms and a lack of technical training in operating the systems. Several doctors admitted they had never received specialized training on medical AI and therefore preferred to rely on conventional methods. This aligns with findings that resistance to AI is often influenced by limited technological literacy and lack of direct experience using such systems [19]. Thus,

enhancing the capacity of medical personnel is a key factor in driving comprehensive and sustainable technology adoption.

From a technical skills perspective, most medical personnel still require guidance when using AI-based software, particularly when AI outputs differ from their clinical intuition. Doctors emphasized the need for accuracy guarantees and algorithm transparency to build trust in the system's results. This corresponds with the argument that AI systems must include explainability features to be accepted by medical staff, avoiding the perception of being a "black box" difficult to interpret [20]. The absence of such features remains a major barrier to optimal AI utilization in practice.

Despite these concerns, nearly all informants expressed a willingness to learn more about AI use in medical practice. They viewed AI not as a replacement for physicians but as a partner to improve healthcare quality. Accordingly, they expected regular training sessions, workshops, and learning modules provided by hospital management and academic institutions such as the University of Bandar Lampung. Prior research also underscores the importance of collaboration between healthcare institutions and academia in developing curricula and training based on advanced medical technologies, including clinical AI [21].

In summary, the perceptions and competence of medical personnel regarding AI at RSUDAM are currently in a transitional phase from skepticism to acceptance. There is significant potential to enhance technology use if supported by training, awareness programs, and user-friendly systems. Strengthening the digital literacy of medical staff must be a hospital management priority, as active human resource involvement is the primary prerequisite for ensuring the success of digital healthcare transformation based on artificial intelligence.

3.2.4. Ethical, Regulatory, and Data Security Challenges

The implementation of Artificial Intelligence (AI) in medical services presents not only opportunities but also various complex ethical and regulatory challenges. Interviews with hospital management and medical staff at RSUDAM revealed concerns about patient data security and legal accountability if the AI system makes diagnostic errors. The absence of specific legal frameworks governing AI implementation in Indonesian public hospitals has led the hospital to adopt a highly cautious approach. Although AI assists diagnostic efficiency, the ethical implications of non-transparent machine recommendations create doubts about the legality and accountability of using such systems in clinical practice.

One of the most pressing issues is determining responsibility in cases of AI misdiagnosis. Should the liability fall on the physician as the decision-maker, the IT team as system managers, or the technology provider as the algorithm developer? The lack of explicit national regulations defining this liability scheme makes it difficult for hospitals to establish standardized operating procedures. Prior research emphasized that one of the major challenges in AI adoption is the legal ambiguity between human and machine roles, particularly in high-risk decisions such as disease diagnosis [22]. As a result, RSUDAM continues to position AI as a "supporting system" without formal status in their medical SOPs.

Another challenge lies in patient data protection. AI technologies require access to large volumes of medical data for accurate analysis. However, RSUDAM currently lacks strong data protection systems, such as advanced encryption, multi-factor authentication, or digital audit mechanisms. Findings indicate that implementing AI without adequate data security systems risks privacy breaches and undermines patient trust [12, 23]. Thus, hospitals must ensure that AI-based data collection, processing, and storage are conducted under high digital security standards.

From the perspective of medical personnel, some expressed uncertainty about ethical boundaries when using AI as a diagnostic reference. For example, when AI results differ from a doctor's clinical intuition, no clear guidelines exist on which should be prioritized. The absence of local ethical guidelines becomes a barrier to consistent AI use. It has been suggested that AI systems should be developed under the principle of "ethics by design," ensuring alignment with professionalism, justice, and patient autonomy from the outset [24]. RSUDAM has not yet established a dedicated digital ethics committee to specifically review the integration of technology in clinical practice.

In conclusion, while AI technology holds potential to improve healthcare quality, its application at RSUDAM still faces serious ethical, regulatory, and data security challenges. Collaboration among hospitals, national health regulators, and experts in medical ethics and law is urgently needed to develop specific guidelines and regulations for AI use in medical diagnostics. Without strong ethical and legal foundations, AI adoption risks creating greater problems than the benefits it promises.

3.2.5. Visual Summary (Infographic)

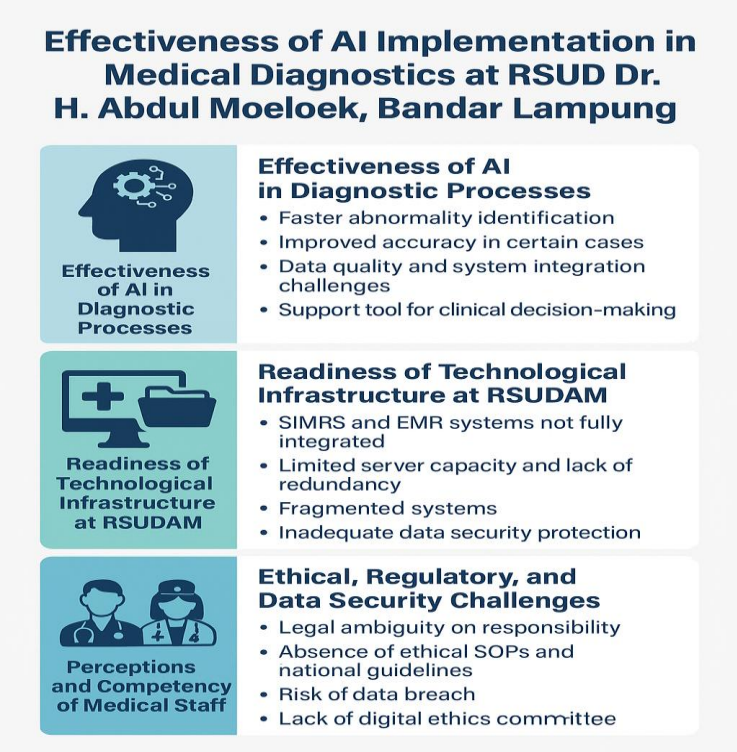

Figure 4. Effectiveness of AI Implementation in Medical Diagnostic at RSUD Dr. H. Abdul Moeloek, Bandar Lampung

The implementation of Artificial Intelligence (AI) in medical diagnostics at Dr. H. Abdul Moeloek Regional General Hospital has demonstrated significant potential in enhancing the efficiency and accuracy of healthcare services. Findings from this study conclude that AI use can accelerate disease identification processes and support clinical decision-making. However, the effectiveness of AI implementation remains highly dependent on the readiness of digital infrastructure, the integration of hospital information systems, and the availability of high-quality medical data.

Moreover, the success of AI adoption is also determined by human factors, particularly the perceptions and competence of medical personnel. While most doctors and operators welcome this technology, skepticism persists due to limited digital literacy and the lack of advanced technical training. Therefore, continuous training strategies and the integration of technology-focused curricula in health education are needed to ensure that AI adoption proceeds effectively and ethically.

Ethical, regulatory, and data security challenges are critical issues that cannot be overlooked in the utilization of AI in healthcare. Hospitals must formulate standard operating procedures and ethical guidelines to minimize risks of privacy violations and legal accountability. Collaboration among the government, hospitals, and academic institutions is essential to build a digital ecosystem that is fair, safe, and inclusive. With a comprehensive approach, AI can serve as a vital foundation for transforming Indonesia's healthcare system into a more modern and responsive service framework.

4. Conclusion

This study shows that the implementation of Artificial Intelligence (AI) in medical diagnostic processes at Dr. H. Abdul Moeloek Regional General Hospital has a significant impact on the efficiency and accuracy of healthcare services. AI contributes to accelerating disease identification, particularly in radiological imaging and clinical data interpretation, although challenges remain in achieving full integration with the hospital information system. The readiness of digital infrastructure at RSUDAM is a key determinant of the success of AI implementation. Observations indicate that the Hospital Management Information System (SIMRS) and the available hardware are not yet fully integrated with AI systems. This limits real-time data processing and reduces the effectiveness of the technology's potential.

From the human resources perspective, the competence and perceptions of medical personnel toward AI technology are still varied. Although there is enthusiasm for digital transformation, most medical staff have not received specialized training, resulting in limited understanding of the system. Continuous training is therefore essential to ensure that AI functions not merely as a passive tool but as an active partner in the diagnostic process.

Ethical and regulatory challenges also emerge as barriers to the implementation of this technology. The lack of clear legal accountability, the potential for diagnostic errors by AI, and concerns over patient data security remain major issues. This underscores the need for a specific legal framework and ethical guidelines to support the safe and accountable use of AI in the medical field.

Overall, although AI implementation at RSUDAM is still in its early stages, its potential benefits are substantial if supported by technological readiness, human resource capacity building, and clear policy support. This study recommends synergy between hospitals, academia, and government in building a digital healthcare system that is adaptive, ethical, and responsive to community needs.

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