ETHICS AND LAW OF USING BLOCKCHAIN TECHNOLOGY FOR ELECTRONICHEALTH RECORDS IN INDONESIA

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ABSTRACT

In Indonesia, the use of blockchain in the context of electronic health records is still in its early stages. Current regulations are more focused on the application of blockchain in the financial and fintech sectors. Meanwhile, the healthcare sector, especially concerning electronic health records, lacks a clear legal framework for this technology. This situation raises concerns about protecting patient rights and data privacy, which are critical aspects of medical ethics. This research aims to examine the legal and ethical framework related to the use of blockchain technology in electronic health records in Indonesia. The research method employed is a normative legal approach with conceptual and statutory approaches derived from secondary data. The results are then analyzed qualitatively. The findings indicate that blockchain has the potential to revolutionize the management of electronic health records (EHR) in Indonesia, in line with Regulation of the Minister of Health No. 24 of 2022. This technology ensures the security, integrity, and transparency of medical data through permanent, immutable records, adhering to principles of confidentiality and data integrity. Blockchain also enables more accountable access management. However, its implementation must consider ethical issues, including patient privacy and regulatory compliance. With the right approach, blockchain can become a foundation for a secure and trustworthy digital health system in Indonesia.

KEYWORDS Ethics and Law, Blockchain, Electronic Health Records

INTRODUCTION

This In today's digital era, technological advancements have brought significant changes across various sectors, including healthcare. One technology gaining increasing attention is blockchain, which holds great potential for managing data, especially in the context of Electronic Health Records (EHR). Blockchain, with its decentralized, secure, and transparent characteristics, offers solutions to common challenges in medical data management, such as security, privacy, and data integrity. In Indonesia, with its large population and diverse healthcare infrastructure, innovative solutions like blockchain are crucial for addressing complexities in medical record management.

Blockchain technology in EHR promises numerous benefits. It can enhance transparency in patient data management, reduce the risk of errors, and provide secure,

decentralized access to medical information. This is vital for ensuring that medical data is efficiently and safely accessible to authorized personnel without compromising patient privacy. However, despite its benefits, adopting this technology raises critical ethical and legal questions.

Implementing blockchain in Indonesia faces several challenges, both ethical and legal. Regulations on data privacy and information security are still evolving, and there are concerns about how this technology will integrate with existing healthcare systems. The lack of a clear legal framework and comprehensive ethical guidelines for blockchain use in EHR raises risks of data misuse, privacy violations, and broader legal issues.

In contrast, the United States has seen pioneering projects like MedRec, developed by MIT, which uses blockchain to manage and secure patient access to EHRs. This technology allows patients full control over who can access their medical data while ensuring that the data remains secure and immutable. Blockchain is also used to facilitate transparency in clinical trials, ensuring that medical trial data is recorded in an unalterable way, enhancing trust and accuracy in clinical reporting.

Thailand is also exploring blockchain for EHRs, focusing on improving efficiency and security in its healthcare system. Significant initiatives include public-private partnerships to develop blockchain-based platforms for hospitals and clinics, enhancing interoperability between various EHR systems, and increasing patient trust in digital health systems. Although blockchain implementation in Thailand faces regulatory and infrastructural challenges, government support and private sector interest are driving its potential to revolutionize EHR management and healthcare quality.

In East Timor, the use of blockchain technology, including in the context of electronic health records, is still in the early stages of development. Although the country has general laws regarding information and communication technology, as well as some regulations related to data privacy, legislation specifically regulating blockchain has not yet fully developed. Existing laws tend to focus on general personal data protection, which is a crucial aspect in the implementation of blockchain, especially in managing sensitive information such as health records. In the financial sector, existing regulations might cover some aspects of blockchain use, including digital currencies, but the legal framework for cryptocurrencies and blockchain technology is still in the process of being developed. The East Timor government is currently exploring or developing blockchain-based projects across various sectors, but specific regulations for this technology are not yet fully established. Additionally, a national strategy for technology, including blockchain, may be part of the government's plan to facilitate the adoption of new technologies while ensuring data protection and privacy. East Timor may also be involved in international initiatives that influence the development of blockchain regulations in the country. Key challenges in this context include the lack of a clear legal framework and the need for more detailed regulatory development. Nonetheless, there are significant opportunities for East Timor to develop regulations that support technological innovation by leveraging international best practices and adapting them to the local context.

Aside from legal aspects, ethical considerations are crucial in using blockchain for EHRs. Medical data is highly sensitive, and misuse or leakage of this data can have severe consequences for individuals. Thus, it is essential to ensure that blockchain technology is implemented with ethical principles that protect patient interests, including privacy, security, and fairness.

This research aims to explore and assess the legal and ethical frameworks related to blockchain technology for EHRs in Indonesia. The study seeks to provide policy recommendations to support effective and responsible blockchain implementation in the

healthcare sector, ensuring that this technology benefits patients and the healthcare system in Indonesia.

RESEARCH METHOD

The research method used in this study is normative juridical, employing both a conceptual approach and a statutory approach, based on secondary data. This study collects legal materials through library research, which involves gathering legal materials by tracing or searching through various laws or literature relevant to the research issue. The collected legal materials, both primary and secondary, are classified according to the legal issues to be discussed. These legal materials are then elaborated to obtain a systematic explanation. The processing of legal materials is deductive, meaning it involves drawing conclusions that move from general problems to more specific or concrete issues. The research findings are then analyzed qualitatively to address the question of how ethics and law apply to the use of blockchain technology for electronic medical records in Indonesia.

RESULT AND DISCUSSION

Blockchain technology stores data in interconnected blocks, forming a network chain where transaction information is stored in each block, encrypted. Blockchain consists of two parts: the block head and block body. The block head contains version values, the hash code of the previous block, a timestamp, and block height, while the block body records all transaction data for that block.

Blockchain is a decentralized system used to openly and transparently record and verify transactions, using strong cryptographic principles to ensure data security and integrity. However, the use of blockchain for electronic medical records (EMR) in Indonesia raises various ethical issues that must be carefully considered. Although blockchain holds significant potential to enhance the security, transparency, and efficiency of medical data management, ethical aspects must be taken into account to ensure that its implementation does not violate individual rights and public interests.

Some relevant ethical principles in this context include:

1. Privacy and Data Confidentiality:
    a. Right to Privacy: Medical data is highly sensitive personal information. Every patient has the right to the privacy of their data, and their medical information must be kept confidential. Although blockchain promises high security, it must be implemented with mechanisms that ensure medical data is accessible only to authorized parties with patient consent.
    b. Informed Consent: The use of blockchain for EMR should be based on informed consent from patients. Patients must be provided with clear and comprehensive explanations about how their data will be used, stored, and who will have access to it.
2. Transparency and Openness:
    a. Limited Access and Data Usage: Patients have the right to know who can access their medical data and for what purposes. Blockchain should be designed to ensure transparency in this process, allowing patients to monitor who accesses their data.
    b. Preventing Data Misuse: Blockchain must have mechanisms to prevent and detect misuse of medical data. For example, if patient data is used by third parties, this must be approved by the patient and overseen by an authorized authority.

3. Data Security and Integrity:
    a. Protection Against Cyber Threats: Although blockchain is known for its security, ethical use requires continuous efforts to protect medical data from cyber threats. This includes ensuring that encryption protocols and other security measures are regularly updated to address evolving threats.
    b. Accuracy and Data Integrity: Ethics also demand that data stored on the blockchain is accurate and not manipulated. Errors or manipulation of medical data can have serious consequences for patient health.
4. Fairness and Accessibility:
    a. Equal Access: The implementation of blockchain in EMR should consider accessibility for all segments of society. There should be no discrimination based on technical, financial, or geographical capabilities in accessing this technology.
    b. Avoiding Injustice: Ethical use of this technology also demands that blockchain is not used to create injustice or discrimination, such as discrimination based on health information.
5. Accountability and Responsibility:
    a. Data Management Accountability: All parties involved in managing medical data through blockchain must be accountable for their actions. If violations or data breaches occur, there should be clear mechanisms for follow-up and sanctions.
    b. Providing Clear Information: Healthcare providers and technology developers are obliged to provide clear and easily understandable information about how blockchain works and its implications for patients.
6. Patient-Centric Focus:
    Patient Interests First: All technological innovations and implementations should prioritize patient interests, including health, security, and privacy. Blockchain should not be used in ways that could harm patients.

The development of legal perspectives and computational technology has a macro influence in two categories. First, there is a need to consider the applicable ethics, regulations, and laws for the technology. Second, there is the consideration of using technology to enhance legal services, the judicial system, and the law itself. Each category presents unprecedented opportunities to leverage significant technological advancements to preserve and expand the rule of law.

Article 20 of the Ministry of Health Regulation No. 24 of 2022 concerning Medical Records explains that Electronic Medical Record storage is the activity of storing Medical Record data on digital-based storage media in Healthcare Facilities. The storage of Electronic Medical Records must ensure the security, integrity, confidentiality, and availability of Electronic Medical Record data. Digital-based storage media include servers, cloud computing systems certified according to statutory provisions, and/or other digital-based storage media based on technological and information advancements that are certified. Healthcare Facilities that store data through digital-based storage media must have a backup system, which is implemented with the following provisions: located in a different place from the Healthcare Facility, carried out periodically, and outlined in the standard operating procedures of each Healthcare Facility. This article demonstrates that blockchain has a clear legal basis as it becomes part of the data storage medium. Article 20 emphasizes the importance of data security, integrity, confidentiality, and availability in electronic medical record storage, closely related to blockchain technology. Blockchain, known for its high-security features, ensures that medical record data cannot be altered or manipulated once stored. The cryptographic mechanisms in blockchain also ensure data

integrity, allowing any changes to be easily traced. Although blockchain is transparent, medical records can be encrypted before being stored, ensuring that only authorized parties can access them, meeting confidentiality requirements. Blockchain technology can also enhance the availability of medical record data, as data stored on blockchain can be accessed anytime and from anywhere. This aligns with the data availability needs stipulated in Article 20. Additionally, blockchain provides inherent data redundancy, where every node in the blockchain network stores a copy of the entire chain, naturally fulfilling the backup system requirements placed in different locations. However, despite blockchain's advantages, its use must still consider ethical issues, especially concerning patient privacy. Blockchain's transparency must be designed not to compromise patient information confidentiality. The implementation of this technology must also comply with Indonesian regulations, including Article 20, to ensure that blockchain use is safe, efficient, and legally and ethically sound. In this context, further research is needed to explore how blockchain can be legally and ethically integrated into Indonesia's medical record system.

Article 29 of the Ministry of Health Regulation No. 24 of 2022 concerning Medical Records states that Electronic Medical Records must meet data and information security principles, including:

1. Confidentiality:
   Confidentiality guarantees the security of data and information from unauthorized internal or external parties, protecting the use and dissemination of data and information in Electronic Medical Records.
2. Integrity:
   Integrity guarantees the accuracy of data and information in Electronic Medical Records, and changes to data may only be made by those authorized to do so.
3. Availability:
   Availability guarantees that data and information in Electronic Medical Records can be accessed and used by those with access rights determined by the Healthcare Facility leadership.

Article 29 establishes three key principles that Electronic Medical Records (EMR) must meet: confidentiality, integrity, and data availability. These principles are highly relevant to using blockchain technology for EMR in Indonesia. Blockchain, with its decentralized and strong encryption mechanisms, can protect medical record data from unauthorized access, aligning with the confidentiality principle in the regulation. Additionally, blockchain ensures data integrity by recording every change transparently and allowing changes only by authorized parties, keeping the data accurate and auditable. Concerning availability, blockchain guarantees that medical record data can be accessed anytime by authorized parties, even if a disruption occurs at one network point. Thus, blockchain not only meets but also strengthens the principles stipulated in Article 29, making it a potential and ethical solution for EMR management in Indonesia.

Article 30 of the Ministry of Health Regulation No. 24 of 2022 concerning Medical Records explains that for the security and protection of Electronic Medical Records data, the leadership of Healthcare Facilities grants access rights to Healthcare Workers and/or other personnel at the Healthcare Facilities. Granting access rights is part of the operational standard procedure policy for managing Electronic Medical Records established by the leadership of Healthcare Facilities. The access rights mentioned in paragraph (1) consist of the right to:

1. Data Entry:
   Data entry is the activity of filling in patient administrative and clinical data by Healthcare Workers providing health services and administrative officers, including Medical Recorders and Health Information, according to their respective fields of

authority. In the context of blockchain, data entry can be tracked transparently and securely. Each time new data is entered, the blockchain records it in a new block linked to the previous block, creating an unchangeable audit trail. This can help ensure that each data entry is made by authorized parties and follows their authority, aligning with the principles of security and integrity outlined in the regulations.

2. Data Correction:
   Data correction is carried out if there is an error in entering patient administrative and clinical data. Data correction can only be made by the Healthcare Worker providing health services and administrative officers, including Medical Recorders and Health Information, within 2x24 hours of data entry. If an administrative data error is discovered after this deadline, data correction is carried out after obtaining approval from the Medical Recorder and Health Information and/or the leadership of the Healthcare Facility. With blockchain, every data correction is permanently recorded in the blockchain, ensuring that every change is clearly documented and can be reviewed anytime.
3. Data Viewing:
   Data viewing is an activity carried out by internal Healthcare Facility personnel to obtain information related to data in the Electronic Medical Records for service or administrative purposes. Access rights are regulated in the Healthcare Facility leadership's policy, considering data and information security principles. Blockchain, with its advanced access control mechanisms, can ensure that only parties with access rights can view medical record data. This technology allows for flexible and detailed access control, where every access request is recorded and audited, enhancing data security and privacy.

Overall, Article 30 can be used as a basis for evaluating how blockchain can be implemented to support access rights management in Electronic Medical Records. Blockchain not only meets the security and data protection requirements outlined by regulations but also offers a more transparent and efficient mechanism for managing data entry, correction, and access. Ethical considerations in blockchain use must also be addressed, especially regarding patient privacy and regulatory compliance.

CONCLUSION

Blockchain technology holds revolutionary potential for enhancing the management of Electronic Medical Records (EMR) in Indonesia, as outlined in Minister of Health Regulation No. 24 of 2022. With its ability to store data in decentralized, interconnected blocks, blockchain ensures not only the security and integrity of medical data but also introduces unprecedented transparency. Every transaction and data change is recorded permanently, enabling an unalterable audit trail. This aligns with legal principles emphasizing data confidentiality, integrity, and availability in EMR. Blockchain also allows for more transparent and accountable access management, ensuring that only authorized personnel can input, correct, and access medical data. However, the implementation of this technology must carefully consider ethical issues, such as patient privacy and regulatory compliance, to avoid infringing on individual rights or public interests. Beyond being just a technology, blockchain offers a new paradigm in medical information management, where access rights can be precisely regulated, and authorized entities can accurately monitor and control data. Nevertheless, this potential must be balanced with strong ethical considerations. Patient privacy, informed consent, and protection against data misuse are crucial factors that must be addressed in the implementation of this technology. With the right approach, blockchain can become a solid

foundation for Indonesia's digital healthcare system, ensuring that medical data is managed with the highest security standards while adhering to applicable laws and ethics. This is not just about adopting technology but also about building trust in an increasingly digitally connected healthcare system

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