Challenges of Implementing Blockchain in Electronic Health Record Architecture: A Systematic Review

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ABSTRACT

Introduction: Blockchain (BT) can potentially revolutionize healthcare data management. Its integration into electronic health records (EHRs) can address interoperability and ethical consideration challenges. This study explored the obstacles to implementing BT in EHRs.

Search Strategy: This systematic review followed the PRISMA guidelines. The search was conducted across major scientific databases, including PubMed, IEEE, and Web of Science, using relevant keywords related to BT, EHRs and challenges. Studies published between 2015 and 2023 were included. Data extraction and thematic analysis were performed after screening the articles based on predefined inclusion and exclusion criteria. Only articles written in English and available in full-text were considered. The exclusion criteria involved articles that did not specifically discuss BT technology in the context of EHRs or did not provide insights into the challenges. The extracted information from each study encompassed various aspects, such as study characteristics (e.g. first author, publication year, and country) and the main domains of challenges and their components.

Results: A total of 236 articles were identified, of which 228 were excluded, and 8 were included in the review. The analysis showed 10-main challenges (critical components), including scalability and performance issues (n = 8), interoperability (n = 1), governance and regulation (n = 5), Energy consumption (n = 12), standardization (n = 5), user experience (n = 2), ethical consideration (n = 5), privacy (n = 2), security (n = 5), and authentication (n = 4) in BT implementation in EHR architecture. It is noteworthy that the studies placed particular emphasis on the security, interoperability and scalability aspects of BT implementation.

Conclusion and Discussion: Examining the challenges of implementing BT in HER architecture reveals critical considerations. Addressing these challenges requires collaborative efforts among healthcare professionals and policymakers. Further research is needed to develop practical solutions that maximize the benefits of BT while mitigating its limitations in the context of EHRs.

Keywords: Blockchain, Challenges, Electronic health records

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