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Review Article

A Review: Blockchain Effect on Healthcare and IoMT

Sobia Shabir[1, *], Jawaid Shabir[2], Ruhanuddin Shaikh[3], Shabir Ahmed Shaikh[4], Mubashira Afzal[5]

[1]Faculty of Biomedical Engineering Department, Sir Syed University of Engineering and Technology, Karachi, Pakistan
[2]Faculty of Computer Engineering Department, Sir Syed University of Engineering and Technology, Karachi, Pakistan
[3]Biomedical Engineering Department, Sir Syed University of Engineering and Technology, Karachi, Pakistan
[4]Science & Technology, International Relations Department, Federal Urdu University of Arts, Karachi, Pakistan
[5]Electronics Engineering Department, Pakistan Navy Engineering College NUST, Karachi, Pakistan

Abstract

Blockchain technology is changing several sectors of the economy, but healthcare is one of the most affected. This study looks at how blockchain is changing healthcare procedures, especially in terms of improving data sharing security and transparency, which is essential for precise diagnosis and efficient treatment. Traditional healthcare systems can be improved to provide more dependable and accessible health records, guaranteeing prompt and accurate medical care, by integrating blockchain. In discussing how blockchain affects the administration of Electronic Health Records (EHRs), the paper emphasizes how patient data can be protected from the risks associated with private companies' centralized control. The management of health information is more secure thanks to this decentralized method, which lowers the chances of data breaches and unauthorized access. The study also examines the growing market for the Internet of Medical Things (IoMT) and consumer medical devices, highlighting the significance of public-private sector cooperation in the creation of blockchain-based healthcare initiatives. For healthcare technologies to advance and to satisfy customer expectations for linked medical devices, these partnerships are essential. This study essentially offers a thorough examination of how blockchain technology is transforming the healthcare sector, specifically about EHR administration and IoMT integration. The study emphasizes the necessity of implementing this technology to build more safe, effective, and patient-centered healthcare systems by discussing its potential and obstacles.

Keywords

Blockchain, Health Insurance, IoMT, Sharing of Data, Medication, and Infrastructure for Distributed Ledgers, Health Records, and Privacy

1. Introduction

Defining documents such as medical records, contracts, and transactions are becoming increasingly digitalized but making them available to desired entities with data security has been challenged. At this point, blockchain is said to enable data

[*]Corresponding author: sobiashabir94@gmail.com (Sobia Shabir), jshabir@gmail.com (Jawaid Shabir), Ruhanuddinshaikh@gmail.com (Ruhanuddin Shaikh), Shabirahmedshaikh59@gmail.com (Shabir Ahmed Shaikh)

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protection, and data security by documenting these transactions in a secure and decentralized manner. Blockchain is becoming an important technology and is just as important as how the internet is perceived due to its impact on health care [1]. A distributed storage solution that holds an increasing collection of data logs that are reviewed by participating nodes is a blockchain. This detail is recorded in a public account containing complete details of the transaction. The decentralized solution that no third-party agency wants in the middle is the blockchain. In the blockchain, information about each transaction so far is shared and available to all nodes. Bitcoins were the first to implement blockchain technologies [2, 3]. The open keyframe in PKI is used for Bitcoin, and the client has an open and private key package. In the Bitcoin customer portfolio location, the open key is used, and the private key is for customer authentication. The Bitcoin exchange contains the sender's open key, all of the recipient's open keys, and the value displaced. The transaction will be written into a block in about ten minutes. This new block is then added to an old block of compounds. Both blocks are stored in the circle storage of consumers, called nodes, providing data for each exchange done. Both nodes store data on Bitcoin device transactions that have been completely documented and verify the quality of each new transaction made using previous blocks. Nodes are paid by checking the accuracy of exchanges [2-4]. This method is called mining, which is confirmed by proof of work, one of the main concepts of ingenuity in the blockchain. Consensus takes place between all nodes by the time all shares are finally checked. New blocks are added to the previous block and all blocks in the same chain are modified. This blockchain is Bitcoin's open disk strategy, called the blockchain [2-5]. Personal health records are extremely private and susceptible to cybercriminals, which could result in consequences and public defamation. Healthcare providers are vulnerable to security risks since they micromanage the majority of medical records. Blockchain technology can offer unrestricted authorization, undeniable preservation, transmission transparency, impartial traceability, and pervasive security, according to an analysis of 122 publications. Blockchain technology is still in its early stages, though. To expedite transparent and reliable preservation, user authorization, and authentication of medical records before their transmission for third-party access, blockchain-assisted frameworks for digital medical record preservation and the resolution of inherent technological issues are necessary. [6, 7]. Health treatment is the most common use of blockchain technology. The healthcare blockchain can resolve data security, privacy sharing, and storage concerns [7]. The purpose of cooperation in health care is to promote the sharing of health information, such as electronic health records, between healthcare providers and patients so that data can be transmitted to various areas of the environment and different hospital adaptation schemes [8, 9]. The opportunity to share health information and data management is essential to strengthening the healthcare system, health facilities, and consumer experience. The purpose of this article is to include an analysis of the effect of IoMT blockchain technology on health care.

2. Problem Statement

In the transmission of data between networks, obtaining information is an important issue. Protection is compromised by the concentration on a distributed cloud of IoMT apps and platforms. Our contribution is to suggest a safe blockchain technology technique or process to provide IoMT data transmission confidentiality, authenticity, and validity.

3. Blockchain in Health Care Technology

In different applications, blockchain technology will play a key role in the health sector in fields such as public health administration, population information, electronic health request arbitration, mobile patient access, medical data sharing, user-based testing, counterfeiting, clinical trials, and precision medicine. Open data on blockchain technologies have been analyzed in several publications in fields such as banking, IoT, security, and privacy. Several research papers concentrate on healthcare blockchain technologies. This study focuses on the functional implications and features of blockchain technology in just three fields, such as public health management, opioid counterfeiting, and user-oriented medical analysis focused on patient personal data, as provided in 2016 by a researcher with a high-level review of new knowledge on block-based health care. Direct transfers are available through a blockchain, where it is possible to remove the central agent manipulating the data, earning a commission, or even interrupting it in a coordinated way [10]. In 2017, in another research study, a bitcoin and blockchain technology was launched that promises decentralized administration, testing for adults, confidentiality, and usability. Compared to conventional distributed lists of biomedical and health technologies, the author has established the value of the blocks. In the biomedical science and health data book, some facets of blockchain technology for medical records processing, and insurance claim process, were identified [11]. The various meanings of the blockchain in the therapeutic services sector are addressed in another overview and demonstrate how the blockchain can help patients and advance how to exchange good-being knowledge. The square chain requires welfare records to be securely attached so that no one will bother them by converting them into a delivery log. Patients have the luxury of deciding why they should get their data and who cannot. It also illustrates the problem of the following pharmaceutical items as a result of tools that involve clarification of the listing of the articles [12]. Another study The investigator assesses the current state of study and implementation of medical treatment in the blockchain. Blockchain health research developments suggest that this is primarily used for the

sharing of data, patient information, and access controls, but also for other situations such as supply chain management or prescribing management [13]. Blockchain health research developments indicate that this is used primarily for data sharing, patient records, and access controls, but occasionally for other scenarios such as supply chain management or prescription. As part of the growth of personalized drugs, the rationalization of health and safety costs, as well as changes in public health policy that bring the most important benefits that can be offered by the implementation of this technology in medical care, access to a large number of public health care data to be used as part of growing personalized drugs [14].

The NHP-health researcher's past shows how to implement blockchain processes. Stable bonds for NHP nodes will be generated using the proposed process. Blockchain health care is used by nodes to share patient information with others. The IEEE 802.15,6 authenticated Association protocol version is expected to be enhanced to begin secure communications. For unique scenarios, HBC is suggested to build NSB channels, as unbalanced loading of calculations is needed. NHP-based systems, including system management and transportation, may be applied to the proposed solution. It should boost the quality of life [15]. In another related report, patient data sharing is important for health information systems. Sadly, medical information is spread across multiple networks of healthcare records. Since it could invade the privacy of the patient. Knowledge of health care is a valuable guide for patients. Without sacrificing privacy or limiting health sharing, it is common to allow patients to own and monitor their results. Using the blockchain network as a storage framework, goal-centered authentication as a single authentication control model, and the transparent and simple indicator-centered schema as a storage model, the architecture supports this [16]. Another analysis has performed a configurable blockchain model creation and data collection platform leveraging many basic opportunities and machine learning systems set up for progressive learning. The system has been developed specifically for models that can be quickly tested, but future studies will hopefully concentrate on more complex models. Ideal situations have different details and labels are generally agreed upon [17].

4. IoMT (Internet of Medical Things)

The Medical Internet of Things is a community of Internet-connected technologies for the delivery of procedures and resources for medical care assistance. As the latest technology for the collection of pre-medical patient body parameters, IoMT has been developed and uses small handheld devices or implant sensors to track their pathologies. IoMT has shown considerable promise to have improved health assurance and serve many wireless medical interface network applications (WBAN). Normally, the IoMT structure consists of three layers: the layer of consciousness, the layer of the network, and the layer of service. The main role of the awareness layer is to use several instruments to gather healthcare data. The network layer consists of the processes of a wired and wireless system and middleware and transmits the information collected from the knowledge layer provided by the technological platform. Well-designed transport protocols not only increase the reliability of delivery and reduce energy consumption but also maintain protection and privacy. To deliver customized patient care according to the real condition of the target population and demand for service, the application layer incorporates medical information tools and addresses the needs of end-users. From five technical points of view, the researcher solves the issues of data security and security and poses future research challenges. Much attention has been paid to IoMT, but relevant technological criteria and specifications continue to evolve, in particular, the basic healthcare implementation requirements, and more productive research is needed [18].

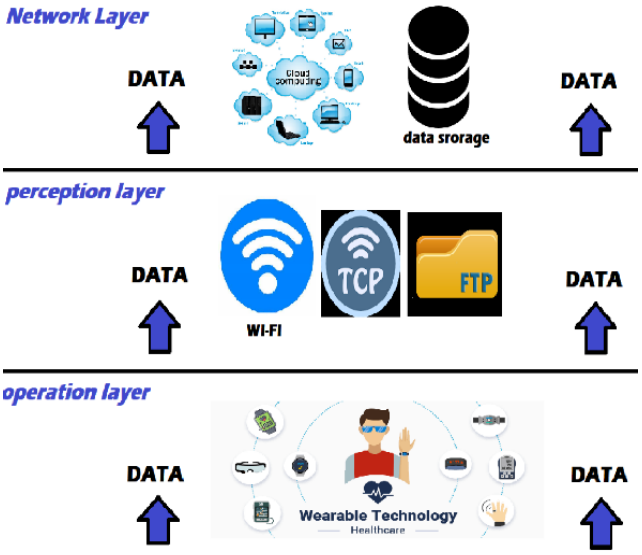

Figure 1. *Structure of IoMT (Three layers of IoMT, the layer of consciousness, the layer of a network, and the layer of service, the awareness layer use several instruments to gather health care data. The network layer consists of the processes of a wired and wireless system and middleware and transmits the information collected from the knowledge layer provided by the technological platform).*

4.1. IoMT and Healthcare Providers

IoMT is a growing field of IoT technologies that include health care using medical devices. The Ido covers multiple fields, from sourcing hardware and components to a variety of procedures that efficiently combine these tiny components. Its meaning remains, however, vague and too broad. "A report entitled "Towards a Conception of the Internet of Things (IoT)" was conducted by the IEEE Internet Initiative to provide the IDO with a sound overview that explains and promotes all the functionality of the IDO [19]. A further study explains a brief definition of the IoT as "the technological area incorporating several technical and social sectors," but admits

that the term is frequently skewed by the assets of the promoter and the particular expectations of the assets of IDO that are deemed most important to the organization of the promoter. An IoT device also needs a disk, machine, or whatever that can unnecessarily transfer data such that a person can operate the conversation, regardless of the term used [20]. The IoT platform may include a wide range of articles that could be correlated with delivering a complex service and allowing a complex procedure to be applied in a particular environmental scenario. This scenario allows an IoT system to become a self-configuring, flexible, and complex network that, through single detection, data storage, data processing, connectivity, and capacity for intervention, links the 'things' with the internet and delivers services through intelligent interfaces, with or without human involvement [19]. An IoT device's main features include interconnecting "objects" (portable or some other physical individual that contributes to a particular program, linking "objects" to the Web (intranet or extranet), uniquely recognized "Things" (E. RIFD tag, a virtual physical entity with a serial number and readable specific, etc.), ubiquitin (a network available anywhere and everywhere), sensor/Performa [19, 21]. It was not just the feature of your machine-to-machine that made the ido "the next big thing" but the capacity for the contact between the sensor and machine. The integration of these technologies into the health paradigm is expected to reduce the annual cost of treating chronic diseases by around 1/3 as health sensors rise more and more [22].

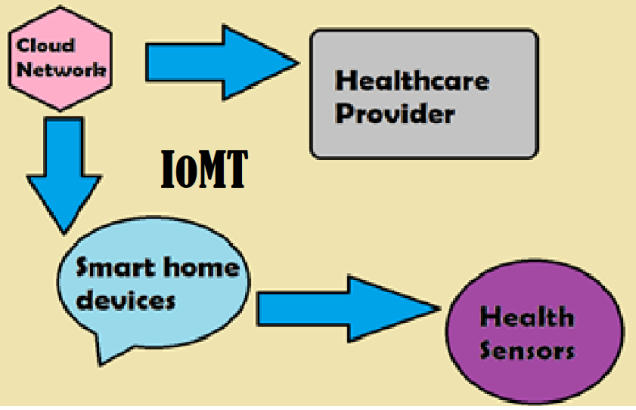

Figure 2. *The Internet of Medical Things lies at the intersection of sensors, cloud computing, and medical monitoring.*

Intelligent handheld devices and wearable instruments have been cross-sectional built to make room for an IoT by-product called the Medical Internet or the Internet of Medical Items. IoMT may be defined as a cloud-like online network, where connectivity from machine to machine is often involved as a link between medical devices and a health system. [22]. The use of IoT for medical purposes, however, and particularly for the treatment of wounds and diabetic feet, is still in its infancy. IoMT is now commonly used for activities such as online surveillance of chronic condition patients, recording drug requests, and smartphone solutions for mobile health care [23, 24].

4.2. IoMT in the Care of the Diabetic Foot

In another study, an intelligent mat based on the IoMT concept, using a bath mat-like factor technology was proposed to periodically monitor the plantar temperature. In specific, a comparable foot mat novel (Podimetrics MatTM, Somerville, MA, USA) was analyzed to estimate the risk of a DFU and help stratify those in need of urgent foot therapy. This user device was designed to not produce any user configurations or settings that had to go on the mat on both feet for around 20s. Therefore, the two temperature profiles were compared by the system. The mat was correct in the estimation of 97 percent of DFUs with an average shipping time of 37 days, using a maximum of < 2 22 °C between the respective sites at opposite feet. With 86% of participants using carpets at least 3 times a week and overall use of carpets 5 times a week, the mat grip was high. This 37-day precision and processing time could be enough to help prioritize people in need of emergency treatment [25].

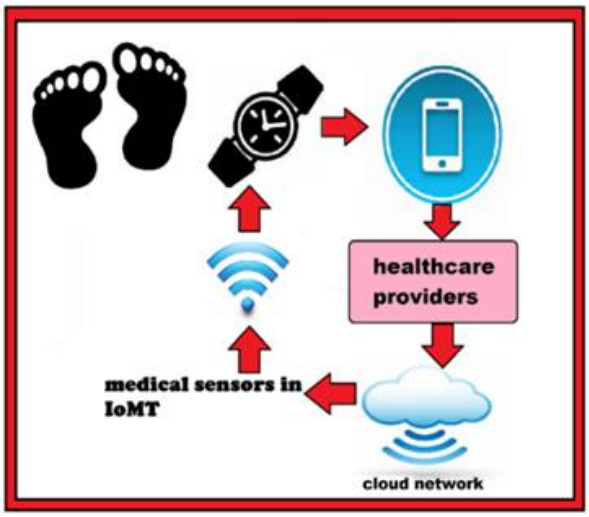

Figure 3. *IoMT in the care of the diabetic foot, the use of IoT for medical purposes, particularly for the treatment of wounds and diabetic feet, is still in its infancy.*

4.3. Blockchain in IoMT

Innovative healthcare approaches and innovations have been developed by IoMT, including remote handling of intelligent software and the use of experimental devices. It would encourage patients to take care of their well-being and, for this reason, embrace patients' significant characteristics and responsibility to construct an integrated environment of exercise care. More and more evolving infrastructure will not only be sufficiently simplest now and will protect patients healthily, but it will also improve how docs deliver specially planned and well-timed treatment. The "affected person protection sensor

marketplace" is predicted to be worth USD 47.40 billion by 2020, in line with recent marketplace studies [26]. The Internet of Factor Solutions calls for the implementation of systems for the construction of ambient assisted living packages, which can include centers within the regions of standard assistance, well-being maintenance, and timely access to clinical and emergency care. At present, scientific staff/assistants/nurses reveal patients in a health facilities environment that helps them to stay free from human error [27]. In several studies for easy connectivity and knowledge exchange in IoT contexts, a blockchain platform is suggested their proposed architecture aims at smart domestic programs [28]. A further study explores the consecration of the decentralization blockchain to deal with IoT security scenarios for challenging conditions. Although clinical IoT packages are critical, only a few modern research reveals that the blockchain era is used to ease IoMT [29]. In [30] limitations and openings concerned with the implementation of safety responses for IoT blockchain-based healthcare systems had been suggested, which offer a global forum to exploit blockchain technologies to ensure that the Internet is safe for therapeutic devices [30]. Another study was introducing a new included clinical assessment machine based entirely on IoMT and cell cloud technologies. This thesis concludes with the development of sensible therapeutic assessment systems on smartphones for health tracking. Using a blockchain community that can effectively exchange data between mobile customers on cell clouds, the cellular utility also introduces a particular statistical sharing approach. This also makes it possible for patients, medical professionals, and other healthcare providers to be linked in an extra-direct and productive way. The proposed platform, with its exciting design functionality, would facilitate the early detection of neurological disorders and improve healthcare treatment [31]. The IoMT-era blockchain network was provided in another proposed work that creates a key order framework for IoMT software, integrates ECC with IBC, incorporates a bolster that hosts a neighboring blockchain in each clinical facility, and connects with multiple facilities to enable the use of clusters to form a global blockchain. more have studies demonstrated the architecture offers a lightweight, stable and personal atmosphere for stop-to-stop latency, prototyping, and performance measurement without a primary overhead, which provides promising outcomes for the green and private maintenance of IoMT [31]. In 2017, the proposed study carried out an in-depth investigation on the private taxonomy and protection of the Internet of Science Stuff (IoMT). Their illustrations described and categorized various security and privacy threats associated with IoMT on the IoT layer, impacts, kind of intruder, attack technique, degree of compromise, CIA compromise, degree of infiltration, the beginning point of attack, and complexity of assault. [32]. The potential of blockchain technology to improve the security, integrity, and utility of the health E-supply chain in the healthcare industry is examined in this paper. It focusses on the healthcare industry, medical supply, product and supply, and the Internet of Medical Things (IOMT). The study intends to outline the benefits and limitations of using blockchain technology in the medical supply and distribution network, emphasizing the necessity of more study and regulatory integration. [31]. Multilayer angle was analyzed in the field of IoMT-primarily dependent structures and Io MT units. The researcher has shown that the CPS methodology allows for higher management not only of robustness, protection, and durability but also of verification and evaluation of tools. Since these issues are crucial when increasing biomedical frameworks, CPS is an effective architecture strategy to extend, incorporate, track, and build these systems. A detailed listing of the use of CPS methods within the IoMT has been provided and practicable study instructions for the IoMT have been provided [33]. In other studies, a suggested simple authentication and key agreement scheme focused entirely on the Diffie-Hellman key trade for a cloud-assisted WBAN network. This scheme allows app users to create networks or routes at ease as well as to log in. Fitness and performance tests suggest that the systems noted above will address barriers to medical frameworks [34]. The WBAN Key Exchange-based cloud-assisted method, completely relaxed authentication and settlement, was translated to Proposed. Furthermore, after they sign in, this scheme will create secure networks or approaches for people inside the gadget. The evaluation of protection and performance indicates that the above-mentioned schemes can solve the problems presented by the use of the hospital therapy system [34]. Any other way IoMT can be used is in parent four to have the right of entry violated. Good policy and a person's identity are related to the information mechanism for access control that saves you, an unwelcome individual, from accessing statistics. Authentication keys use some methods of encryption, including symmetric key encryption (SKE), uneven key encryption (AKE), and completely feature-based encryption (ABE) [35]. This research explores the potential of blockchain technology in healthcare management, particularly in consumer medical gadgets and connected portable devices. It highlights the importance of electronic health records, the Internet of Medical Things, and the role of public-private partnerships in digital community design. [36]. Researchers are looking at the blockchain's revolutionary function in tracking electronic health data and discovering the positioning of public-personal partnerships in introducing blockchain healthcare policies and addressing the rapidly emerging wearable fitness equipment and clinical networks segment [37]. Furthermore, a cloud-based scheme has been implemented with the use of IoT sensors related to digital signature, time-stamping, and asymmetry generation to track other private data. This scheme can be very successful in the provision of research offers and the use of fewer scientific sources [38].

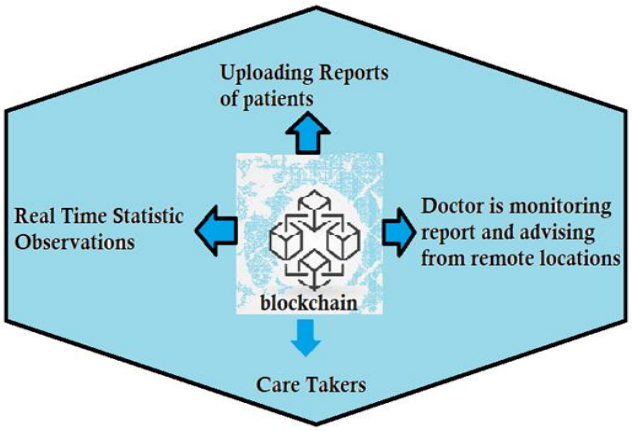

Figure 4. *Blockchain-based IoMT architecture explains how the patients' reports are uploaded after monitoring.*

Additionally, a wireless sensor structure-based system on a technical cloud was introduced. They have been delivered to acquire control input that supports dynamic and complex security rules based primarily on the encryption function of the cipher text coverage (CP-ABE) [39]. In another look, a brand-new blockchain entirely IoT-based variant has been created to deliver the existing IoT-based remote patient management system with improved protection and privacy. Where the variant includes an extra complicated and lightweight cryptographic record that alternates between network and cloud storage, techniques consisting of the ARX encryption scheme. Similarly, a twin encryption structure is used to comfort the symmetric key for the lifetime of the society, and a Hellman key encystation technology device for block chaining networks has additionally been placed in place to secure our public key from an intruder. The idea of ring signatures gives essential privacy houses consisting of Signers' anonymity and signature correction [40]. Another academic study specializes in the various technical elements of the blockchain and how this new infrastructure can help current attempts to decorate the PMS gadget medical device [41]. In further research, a framework was created and implemented for the collection, trade, and coordination of personal health facts between individuals and healthcare providers, as well as coverage agencies. To discuss the use of health information for research purposes, the method may also be extended. By imposing a blockchain age, the mechanism is applied in a dispensational and trustless manner. At about the same time, the algorithm for managing the text of the fact would protect both credibility and anonymity [42]. In addition, related to the opportunity to overcome deployment problems that involve public versus personal key admissions, delegated ledger size hurdles, speed, trouble, and safety pitfalls, concepts, and ideas underlying the technologies and implementations specific to medical imaging are discussed [43]. In another report, the strategy for transforming the era of the Block Chain Wise Agreement was suggested and addressed to address technological challenges. To build large-scale clinical data sets from heterogeneous scientific data units by distributed management of several record units of different ownership, use AI-included blockchain smart agreement generation to make it readily accessible for massive record analytics and AI analysis [44]. The assessment of a blockchain radiologist addressed how the blockchain plays a key role and is important for medical imaging professionals to get to know the age [45]. Moreover, the scope, technique, challenges, and computer architecture of the blockchain system for clinical discipline, in particular for clinical trials and precision remedies, are briefly defined in the proposed in terms of precision medicine, the integrity of information, aggregation of evidence, identity protection, large data analytics, allocated and parallel processing, props and patient-focused design [46]. In the other way, the technology at the back of the blockchain was represented, and the IoMT, a mainly based security paradigm, modified the usage of blockchain to be proposed to ensure the security of passing records between linked nodes [47]. In another investigation, the importance of blockchain technology for trendy healthcare tracking and purchasers of medical electronics and related mobile devices was observed which Analyzes the disruptive function of the digital health information (DHI) blockchain and discuss the quickly evolving marketplace of consumer patient electronics and the medical stuff network, having recognized the shortcomings of private and organized organizations for accessing affected person statistics [48]. For the mobile cloud garage and the blockchain, a new EHR sharing scheme was suggested. To demonstrate consumer access and ensure secure and safe sharing of EHRs, the proposal is focused on a single smart settlement. The proposed solution has been introduced in the Amazon cloud, where, with an Android utility, scientific institutions can speak to the Ehrs Sharing Framework [49]. A new work in Clinical Matters (IoMT) to protect the Internet illustrates a lightweight blockchain-based scheme. Four key components are included in the proposed response: a cloud infrastructure, a network cluster, a clinical center, and a smart medical system [50].

Table 1. *Block Chain in Health Care Technology.*

AUTHOR	TOPIC	YEAR
Mettler, M.	Rising blockchain-based health data	2016
Azaria, A.; Ekblaw, A.; Vieira, T.; Lipman, A.	Use blockchain to view and handle medical records.	2016
Yue, X., Wang, H., Jin, D., Li, M., Jiang, W.	Health data gateways: Health intelligence based on the blockchain with novel privacy risk management.	2016

AUTHOR	TOPIC	YEAR
Kuo, T.T.; Kim, H.E.; Ohno, Machado, L.	Blockchain has distributed ledger technologies for biomedical and health care uses.	2017
Hölbl, M.; Kompara, M.; Kamišalic, A.; Nemec Zlatolas, L.	A Comprehensive Study of Blockchain Use in Healthcare.	2018
Radanovic, I.; Likic, R.	Opportunities for the use of Blockchain Technologies in Pharmacy, Health Economics Use.	2018
Stagnaro, C. White Paper:	Creative Blockchain Health Care Uses.	2019

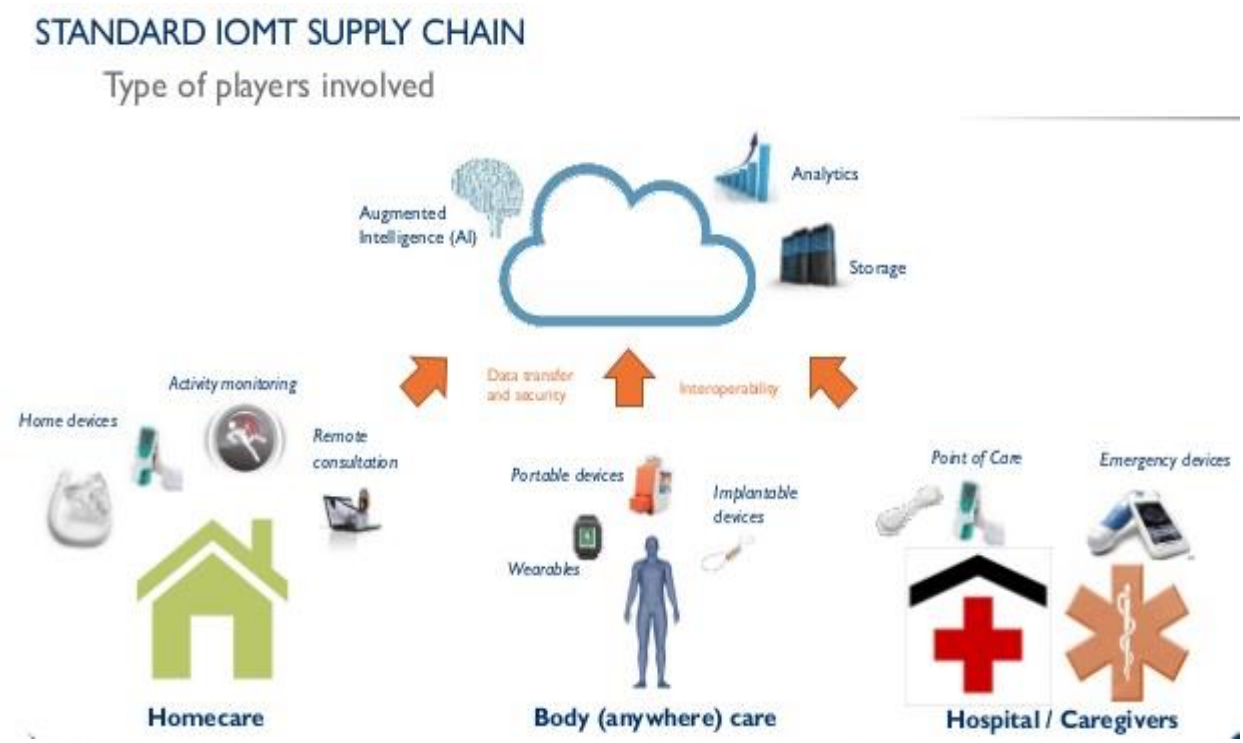

Figure 5. *Online supply chain of medical equipment. Year Wise Progress of the Review.*

Table 2. *Iomt and Healthcare Providers & In the Care of the Diabetic Foot.*

AUTHOR	TOPIC	YEAR
Châzigiannakis I, Hasemann H, Karnstedt M, et al.	Real self-configuration of the IoT.	2012
Gubbi J, Buyya R, Marusic S, Palaniswami M.	Internet of Things (IoT): view, architectural characteristics, and potential paths.	2013
Minerva R, Biru A, and Rotondi D.	Defining the Internet of Things (IoT).	2015
JD Miller, B Najafi, DG Armstrong	Present requirements and improvement in the protection of diabetic ulcers and the prevention of dropping elderly with wearable devices.	2015
Klonoff DC, Germany.	Fog and edge computing architectures for the care of data from applications attached to the internet of medical supplies.	2017
Najafi B, Shahinpoor M. Armstrong DG.	Potential uses for gerontology with smart multifunctional wearable fabrics.	2017
Gordon IL, Frykberg RG, Reyzelman AM, etc.	Feasibility and effectiveness of smart mat technology for the prediction of diabetic plantar ulcer growth. Treatment with Diabetes.	2017

Table 3. Blockchain in IoMT.

AUTHOR	TOPIC	YEAR
M. Li, Yu S., and Y. Zheng. Zheng.	Scalable and secure sharing of personal health information using attribute-dependent encryption in cloud computing.	2012
Chiuchisan, I.; Geman, O.; Costin, H.N.;	Adopting innovations for the Internet of Things in healthcare facilities.	2014
T.Geng, X.Yan, H.Ding.	Effective Sensitive Data Protection Cryptographic Access Control Protocol.	2014
A. A. Hadjidj, Lounis, A. Bouabdallah, Y. Challal.	Cloud healing: Secure cloud architecture for wireless medical sensor networks.	2016
C.-T. Li, C.-C. Lee, and C.-Y. Weng.-Weng.	In the portable emergency medical care system, a secure cloud-assisted wireless body area network.	2016
Raja Jurdak, Dorri, Salil S. Kanhere, and Praveen Gauravaram.	IoT encryption and privacy blockchain: The case study of a smart home.	2017
Alsubaei, F., A. Abuhussein, A., & S. Shiva	Internet of Medical Things: Protection and Privacy:	2017
Alsubaei, F., A. Abuhussein, A., & S. Shiva	Internet of Medical Stuff Protection and Privacy: Taxonomy and Risk Management.	2017
Bodenheimer's, L.	IoT and Blockchain - Pharmacy Prescription.	2017
MD, Lippman, A, Ekblaw, A. Halamka, D.	The opportunity for the transformation of electronic health records through Blockchain.	2017
X. Liang, J. Zhao, J. Liu, S. Shetty, and D. Li. Li.	Integrating the blockchain into mobile healthcare systems for data sharing and collaboration.	2017
Z. Shae, J. Tsai. Tsai.	On the Concept of a Clinical Trial and Precision Medicine Blockchain Network.	2017
D. Puthal, N. Malik, S. P. Mohanty, E. Kougianos, and C. Yang.	As a decentralized encryption system, the blockchain.	2018
W. Sun, Z. Cai, Y. Li, F. Liu, S. Fang, and G. Wang.-Wang.	In the Medical Internet of Things, security and privacy:	2018
Z. Shae, J. Tsai. Tsai.	Turn the Blockchain into a Precision Medicine Distributed Parallel Computing Architecture.	2018
J. Crichigno, G. Srivastava, and S. Dhar. Dhar.	A Blockchain of Light and Safe Healthcare for IoT Medical Equipment.	2019
Josep Pane, Lacey Shrum, Katia M. C. Verhamme, Irene Rebollo & Miriam C. J. M. Sturkenboom	Applications of Blockchain technologies to post-market medical device monitoring.	2020
M. P., McBee, Wilcox, C.	Blockchain Tech: Medical Imaging Concepts and Uses. J Digit Imagery.	2020
Chohan, U. W.	A General Introduction: Contemporary Monetary Theory (MMT).	2020

5. Conclusion

In a possible area for the future society that encompasses both centralized and decentralized models, blockchain technology can be very complementary. The blockchain, like any transformative technology, is an innovation that initially disrupts and can encourage the development of a larger ecosystem that integrates both old and new technologies over time. These historical explanations are that the radio's advent contributed to a spike in album sales, and book sales were improved by readers such as the Kindle. We're having the New York Times news today, blogs, Twitter, and personalized drone sources. We access media from big film corporations as well as YouTube. A database alone represents a blockchain with a special bulk of functionality but no specific description. It is given a function and functionality by an interconnected program such as Bitcoin or Ethereum. We thus differentiate between the blockchain and the application layer that, for the advantage of technology, must complement each other. If a researcher continually integrates BT into the whole study cycle, it can be useful for checking algorithms or analyzing sensory data in every phase, including

partially for experimentation. There are also gaps in the implementation of healthcare and medical technologies to establish a win-win environment for all parties, as has been seen. It is also capable of allowing new user models for research management, peer review, financing, and publishing in combination with sophisticated application design and development. However, standards must be reasonable; BT is not a cure for all existing scientific challenges or an all-in-one approach. As long as the adoption of BT continues to increase, we expect it to mature more consistently. In this sense, the solving of the problems discovered will play a crucial role in the future. The current condition is similar to a green world where there are no specific constraints, and a variety of resources are available for researchers to create creative blockchain-based inventive applications and deployment scenarios.

Abbreviations

EHR	Electronic Health Records (EHRs)
IOMT	Internet of Medical Things
IoT	Internet of Things
BT	Biotechnology
DHI	Digital Health Information
SKE	Symmetric Key Encryption
AKE	Uneven Key Encryption

Author Contributions

Sobia Shabir: Conceptualization, Data curation, Investigation, Methodology, Writing – review & editing

Jawaid Shabir: Conceptualization, Supervision, Visualization, Writing – original draft, Writing – review & editing

Ruhanuddin Shaikh: Methodology, Resources, Visualization

Shabir Ahmed Shaikh: Resources, Supervision, Visualization

Mubashira Afzal: Conceptualization, Methodology, Resources, Writing – review & editing

Conflicts of Interest

The authors declare no conflicts of interest.

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Research Fields

Sobia Shabir: Blockchain technology, Healthcare systems, Internet of medical things, Data Security, Health informatics

Jawaid Shabir: Blockchain technology, Healthcare systems, Internet of things, Data security, Machine learning, Javascript

Ruhanuddin Shaikh: Blockchain technology, Healthcare systems, Internet of medical things, Data Security, Health informatics

Shabir Ahmed Shaikh: CPEC, Blockchain Technology, Political science, Data security, International relation, Data acquisition

Mubashira Afzal: Blockchain technology, Data security, Healthcare system, Internet of things, Signal processing and coding theory, Machine Learning