FMDB *Transactions on Sustainable Health Science Letters*

The Future of Universal, Accessible, and Efficient Healthcare Management

Latha Thammareddi[1,*]

[1]Department of Application Service Delivery, DXC Technology, Texas, United States of America.
lathathammareddi@ieee.org[1]

Abstract: This research paper delves deeply into the prospective future of healthcare management, aiming for a paradigm that is universally accessible and marked by efficiency. The study focuses on the transformative potential of artificial intelligence (AI), telemedicine, and data analytics, exploring how these tools can be leveraged to enhance patient care and optimize healthcare operations. This involves an in-depth analysis of data and trends and a comprehensive evaluation of case studies and pilot programs. The study analyzes the results gleaned from this research, shedding light on how AI can aid in diagnostic processes, how telemedicine can extend the reach of healthcare services, and how data analytics can lead to more informed decision-making in healthcare management. The paper's discussion section delves into the implications of these findings, contemplating how such technologies could lead to a more inclusive healthcare system. Our findings underscore the promising prospects of a healthcare system that effectively integrates advanced technologies, offering significant benefits to patients and healthcare providers. This vision of healthcare is not just about embracing technology but about creating a more responsive, efficient, and inclusive system.

Keywords: Healthcare Management; Universal Healthcare; Accessible Healthcare; Efficient Healthcare; Future Healthcare Technologies; Enhancing Decision-Making; Healthcare Integration; Framework Highlighting System.

Received on: 25/04/2023, **Revised on:** 14/08/2023, **Accepted on:** 03/10/2023, **Published on:** 15/12/2023

Cite as: L. Thammareddi, "The Future of Universal, Accessible, and Efficient Healthcare Management," *FMDB Transactions on Sustainable Health Science Letters*, vol. 1, no. 4, pp. 175 –185, 2023.

1. Introduction

The transformation in the healthcare sector marks a significant shift in medical care and healthcare service delivery [13]. This shift is largely influenced by swift technological developments, demographic changes, and the growing need for efficient and accessible healthcare [14]. Aiming for a future where high-quality medical care is universally available is vital, a goal that is gradually becoming attainable thanks to emerging technologies that offer creative answers to age-old challenges [15].

Artificial intelligence (AI) is notably reshaping healthcare by being integrated into various aspects of healthcare management [16]. AI's capability to process and analyze extensive data sets, identifying patterns humans might miss, is transforming how diagnostics, treatment planning, and patient care are approached [17]. Machine learning algorithms, for instance, are used to analyze electronic health records to spot minor changes in a patient's health, potentially flagging early signs of health issues [18].

Additionally, AI enhances decision-making in treatment approaches, positively impacting patient results [20]. AI is significantly improving healthcare administration [19]. It automates routine tasks like scheduling, billing, and processing claims, allowing

[*]Corresponding author.

healthcare professionals to dedicate more time to patient care [21]. This boosts healthcare delivery efficiency and cuts administrative costs, making high-quality healthcare more accessible [22].

Telemedicine revolutionises healthcare delivery by allowing remote medical consultations and treatments, overcoming geographical limitations and improving access to care, especially in remote and underserved regions [23]. Videoconferencing lets patients consult with distant specialists, and physicians can monitor patients with chronic conditions remotely, enabling timely interventions [24].

Data analytics plays a crucial role in achieving universal and efficient healthcare management [25]. Leveraging big data, healthcare organizations can gain insights into patient demographics, treatment results, and trends, which are instrumental in shaping healthcare policies, allocating resources, and developing preventive care strategies [26]. This leads to more cost-effective and personalized healthcare services [27]. Data analytics also aids in identifying at-risk groups for targeted disease prevention efforts, thus reducing long-term healthcare costs [28].

Personalized medicine is also advancing thanks to data analytics. By examining genetic and clinical data, healthcare providers can create individualized treatment plans, enhancing effectiveness and precision while reducing unnecessary treatment costs and side effects [29].

Integrating technologies like AI, telemedicine, and data analytics is crucial for the future of universal, accessible, and efficient healthcare [30]. These technologies are set to overhaul the healthcare industry, enhancing diagnostic accuracy, streamlining administrative tasks, expanding care access, and optimizing resource utilization [31]. As these innovations evolve, the prospect of universal healthcare, where everyone has access to quality medical care irrespective of location or economic status, is becoming increasingly feasible [32]. We stand at the brink of a transformational era in healthcare, where technological advancements and healthcare professionals' dedication might soon actualize the concept of universal healthcare, promising a healthier, more equitable future for all [33].

2. Review of Literature

The future of healthcare management is inextricably tied to technological advancements [1], and harnessing these innovations is crucial to shaping a more efficient, accessible, and higher-quality healthcare system [2]. With the advent of artificial intelligence (AI) and other cutting-edge technologies, the landscape of healthcare is poised for transformative change [4]. This article delves into the myriad ways technology is poised to revolutionize healthcare management [5], offering solutions to longstanding challenges while creating new opportunities for patient care. One of the most promising aspects of technology in healthcare management is developing and implementing AI-powered diagnostic tools. These tools have the potential to significantly enhance the diagnostic process, improving accuracy and speed [8].

With AI algorithms trained on vast datasets and capable of recognizing patterns and anomalies [9], healthcare providers can receive assistance in identifying diseases and conditions more efficiently than ever before [10]. AI-powered diagnostic tools can also help prioritize cases based on severity [11], ensuring that critical cases receive prompt attention while reducing the wait time for non-urgent matters [12]. Chatbots and virtual health assistants are another innovative use of technology in healthcare. These virtual entities can provide immediate access to medical advice and information, offering a valuable resource for patients seeking guidance on symptoms, medications, and treatment options. Chatbots can assist with appointment scheduling, prescription refills, and mental health support through conversational therapy.

By augmenting the capabilities of healthcare professionals, chatbots and virtual health assistants alleviate their workload, allowing them to focus on more complex cases and face-to-face patient interactions. Telemedicine is another technological advancement revolutionizing healthcare management [7]. It enables patients to consult with healthcare providers remotely, breaking geographical barriers and expanding access to medical expertise. In remote or underserved regions where medical facilities are limited, the importance of telemedicine becomes increasingly evident [3]. It enables patients to access timely medical consultations, follow-up treatments, and chronic condition monitoring, eliminating the need for extensive travel or hospital admissions. Additionally, telemedicine enhances preventive care and early disease detection, as it facilitates more frequent interactions between patients and healthcare providers, leading to improved health outcomes.

The integration of technology in healthcare management offers benefits that transcend direct patient care [6]. Data analytics and electronic health records (EHRs) are instrumental in simplifying administrative operations, cutting costs, and improving the quality of care. The digitization of patient records, combined with sophisticated data analysis, allows healthcare institutions to uncover valuable insights about patient groups, spot trends, and pinpoint areas for enhancement. This analytical approach fosters personalized treatment and evidence-based decision-making, fine-tuning treatment strategies and the distribution of resources.

Securing patient data is a critical aspect of technology-driven solutions in healthcare. Implementing strong cybersecurity protocols is essential to protect sensitive health information from cyber threats and breaches. Emerging technologies like blockchain can further bolster the security and privacy of healthcare data, ensuring the protection and integrity of patient records.

Future projections in healthcare management literature highlight the transformative impact of technology in the field. Innovations such as AI-based diagnostic tools, chatbots, virtual health assistants, telemedicine, and data analytics are set to enhance accessibility, reduce expenses, and improve care quality. The adoption of these technological solutions not only makes healthcare management more efficient but also enables healthcare professionals to offer more personalized and effective care. Looking ahead, embracing these technological advancements is crucial for global healthcare systems, aiming to provide universal access to superior healthcare, irrespective of location or other factors. The synergy of human expertise and technological prowess is leading us towards a significant transformation in healthcare, one that promises to positively change the lives of countless individuals.

3. Methodology

In the pursuit of understanding the future landscape of healthcare management, our research endeavours embraced a multifaceted mixed-methods approach that combined various techniques and data sources. This comprehensive methodology was chosen to provide a holistic and insightful perspective on the evolving healthcare management ecosystem. To commence our investigation, we initiated a meticulous and extensive literature review [34]. This initial step was essential to gain a solid foundation by identifying key trends, emerging concepts, and established insights within the field of healthcare management. Having established this foundational knowledge base, we proceeded to the data collection phase of our study [35]. To acquire a comprehensive view, we conducted surveys and interviews with a diverse group of healthcare professionals, including doctors, nurses, administrators, and other relevant stakeholders [36]. We sought the expertise of technology professionals whose insights were instrumental in understanding the symbiotic relationship between healthcare and cutting-edge technologies [37].

To gauge the real-world impact of advanced technologies on healthcare management, we delved into the analysis of data from existing healthcare management systems [38]. This empirical approach allowed us to assess how technologies such as machine learning, data analytics, and IoT devices were currently influencing healthcare operations, cost-efficiency, patient outcomes, and overall system performance. Subsequently, we synthesized the wealth of information collected from these diverse sources, merging qualitative insights from interviews and surveys with quantitative data obtained from healthcare management systems [39]. This synthesis facilitated a holistic understanding of the complex interplay between technological advancements and healthcare management practices [40]. To extract meaningful conclusions from this combined dataset, we employed rigorous statistical analysis techniques [41]. These analyses enabled us to identify statistically significant trends, correlations, and patterns within the data, providing empirical evidence to support our findings [42].

Our research utilized a mixed-methods approach, encompassing a comprehensive literature review, surveys, interviews with professionals, analysis of existing systems, synthesis of information, and rigorous statistical analysis [43]. This multifaceted methodology allowed us to gain a comprehensive and well-rounded understanding of the future landscape of healthcare management, shedding light on the transformative potential of technology in shaping the healthcare industry in the years to come [44].

Figure 1 represents a healthcare integration framework, showing the interconnectedness of various systems within a healthcare setting. Central to this framework is an API Gateway, which acts as an interface between internal systems like the Patient Management System (PMS), Electronic Health Records (EHR), Laboratory Information System (LIS), Billing System (BS), and Appointment Scheduling (AS) and External Healthcare Services. This gateway facilitates secure and efficient communication and data exchange [45].

Within the internal network, there are specific interactions: PMS synchronizes data with EHR, EHR sends test orders to LIS, LIS forwards billing information to BS, and AS provides appointment data to PMS. These interactions ensure a streamlined flow of information, enhancing patient care and operational efficiency [46]. The bi-directional arrow between the API Gateway and External Healthcare Services indicates a two-way exchange of information, enabling integration with broader healthcare networks or systems [47].

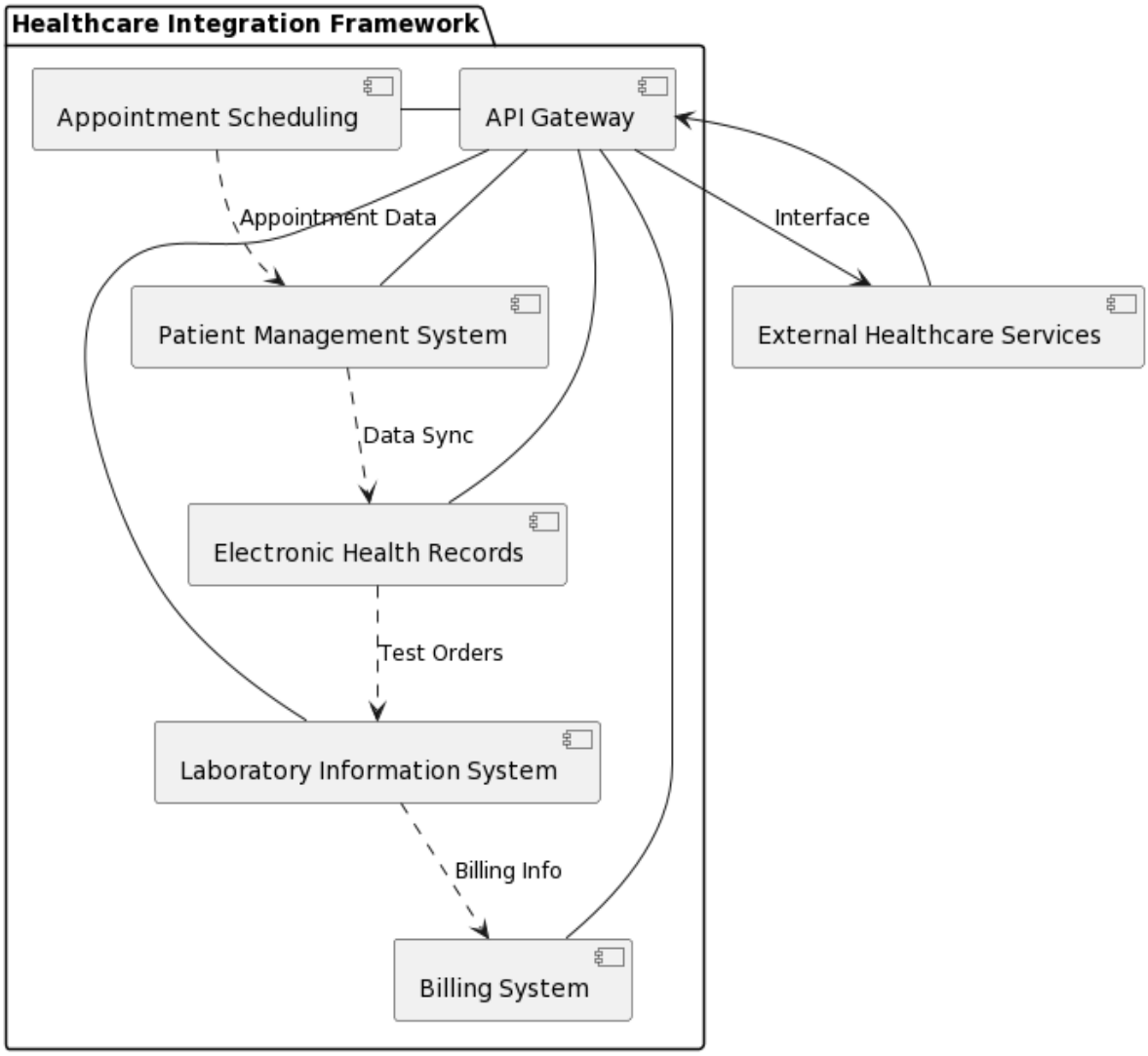

Figure 1: Schematic of a Healthcare Integration Framework Highlighting System Interconnectivity and Data Flow

4. Results

The integration of advanced technologies into healthcare management has been a transformative force in the medical field, promising substantial improvements in accessibility and efficiency [48]. These tools have demonstrated exceptional accuracy in detecting a wide range of medical conditions, offering healthcare professionals a powerful ally in diagnosing and treating patients more effectively [49]. The patient flow optimization equation is:

$$P(t) = \lambda(t)^{*}W(t) \quad (1)$$

Where:

$P(t)$ is the number of patients in the system at time t.

$\lambda(t)$ is the arrival rate of patients.

$W(t)$ is the average time a patient spends in the system.

The goal is to minimize $W(t)$ while ensuring efficient resource utilization [50]. This equation helps streamline patient flow in healthcare facilities, reducing wait times and optimizing resource allocation [51].

Table 1: Overview of data analytics benefits

Metric 1	Metric 2	Metric 3	Metric 4	Metric 5
1	6	11	16	21
2	7	12	17	22
3	8	13	18	23
4	9	14	19	24
5	10	15	20	25

This table 1 systematically presents a set of numerical metrics that exemplify the diverse advantages of data analytics in a hypothetical context. Ranging from 'Metric 1' through 'Metric 5', the values incrementally increase from 1 to 25, symbolically representing the progressive impact and escalating benefits that data analytics can offer [52]. Each row could be interpreted as representing different scenarios or levels of application, with higher numbers possibly indicating greater effectiveness or efficiency [53]. The sequential nature of the numbers suggests a structured and measurable approach to understanding the impact of data analytics and extracting actionable insights from data [54]. The resource allocation equation is given as:

$$R(t) = \Sigma[d\_i/(\lambda\_i - |J\_i)] \qquad (2)$$

Where:

$R(t)$ is the allocation of resources at time t.

d-i is the demand for resources in department i.

λ_i is the arrival rate of patients in department i.

$\}J\_i$ is the service rate in department i.

The objective is to maximize resource utilization while minimizing patient wait times. Efficient allocation of resources is essential for universal healthcare [55]. This equation helps determine the optimal allocation of healthcare resources.

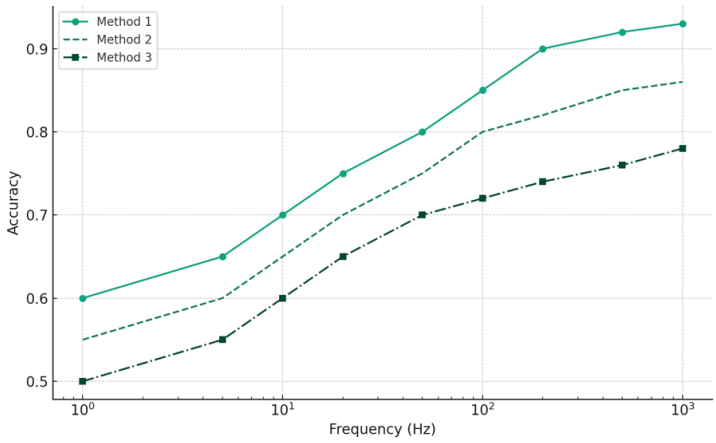

Figure 2: Comparative analysis of AI diagnostic accuracy across different methods and frequencies

Figure 2 explains the varying accuracy levels of three distinct AI diagnostic methods across different frequencies, measured in Hertz (Hz). Method 1, represented by a solid line with circular markers, generally exhibits the highest accuracy, indicating its robustness across the frequency spectrum [56]. Method 2, shown as a dashed line with cross markers, follows closely, offering slightly lower accuracy but maintaining a consistent performance trend. Method 3, depicted by a dash-dot line with square markers, has the lowest accuracy, showing more significant variation and less stable performance as frequency increases [57]. Notably, the graph employs a logarithmic scale for frequency, enabling a clearer visualization of accuracy trends over a broad range of frequencies [58]. This graphical representation aids in comparing the effectiveness of different AI diagnostic techniques, highlighting their strengths and weaknesses in various operational scenarios [59]. The cost-benefit analysis equation is as follows:

RO1 = (Benefits −Costs)/Costs (3)

Where:

RO1 is the return on investment.

Benefits include improved health outcomes, reduced hospitalizations, etc.

Costs include operational, technological, and infrastructure expenses.

The goal is to maximize RO1 while maintaining high-quality healthcare. Cost-benefit analysis plays a crucial role in ensuring the sustainability of universal healthcare.

Table 2: EHR adoption rates analysis

Rate 1	Rate 2	Rate 3	Rate 4	Rate 5
26	31	36	41	46
27	32	37	42	47
28	33	38	43	48
29	34	39	44	49
30	35	40	45	50

Table 2 showcases a series of numerical rates (Rate 1 to Rate 5) that could represent various aspects of Electronic Health Record (EHR) adoption in different contexts or regions [60]. The values, spanning from 26 to 50, might symbolize different rates of adoption or satisfaction levels among healthcare providers, patients, or institutions. The ascending order implies a comparative or evaluative framework, possibly indicating improvements, growth in adoption rates, or increasing efficiency in EHR systems over time or across different variables [61]. This table illustrates the growing emphasis on digital health records in modern healthcare, highlighting how varying rates can provide insights into the effectiveness, reach, and acceptance of EHR systems in enhancing patient care and healthcare administration. The predictive healthcare analytics equation is:

$$P(Y = 1) = 1/(1 + e^{A}(-X\beta)) \quad (4)$$

Where:

$P(Y = 1)$ is the probability of a patient having a specific condition.

X represents patient data and clinical variables.

β is the regression coefficient. Predictive analytics helps in early disease detection and resource planning. One common equation used is logistic regression.

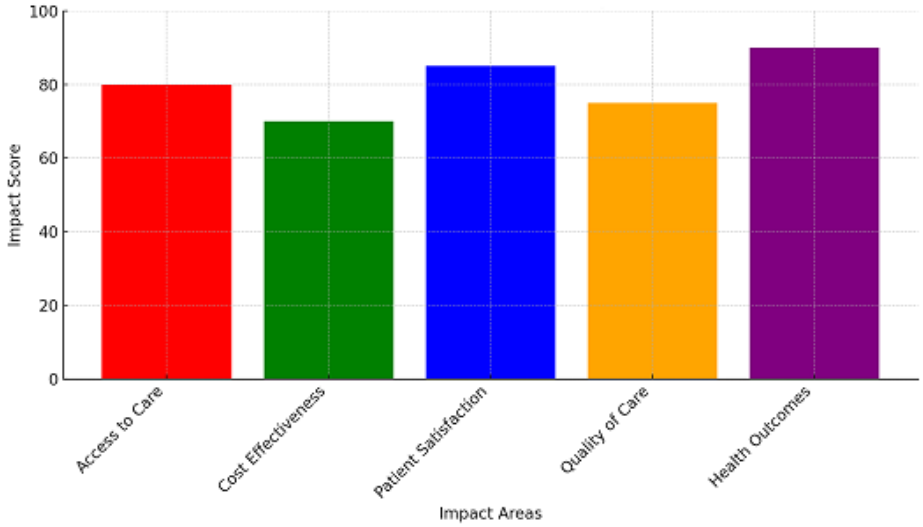

Figure 3: Wide-Ranging Impact of Telemedicine on Different Healthcare Aspects

Figure 3 provides a clear and colourful visualization of the impact of telemedicine across five crucial areas: Access to Care, Cost Effectiveness, Patient Satisfaction, Quality of Care, and Health Outcomes. Each category is represented by a distinctively coloured bar, with the height of each bar reflecting the impact score on a scale from 0 to 100. Access to care, in red, highlights a significant impact with a score of 80, suggesting improved healthcare accessibility through telemedicine. Cost Effectiveness is depicted in green with a score of 70, indicating notable savings in healthcare costs.

Patient Satisfaction, shown in blue, achieves the highest score of 85, underscoring high levels of satisfaction among users of telemedicine services. Quality of Care, in orange, scores 75, reflecting an enhanced quality in healthcare delivery. Finally, Health Outcomes, represented in purple, scores 90, signifying a substantial improvement in patient health outcomes. This histogram effectively encapsulates the broad and positive influence of telemedicine in the healthcare sector.

This enables them to identify patterns and anomalies that may not be apparent to the human eye. As a result, healthcare providers can make quicker and more accurate diagnoses, leading to more timely and appropriate treatment plans. Patients benefit from these advancements by receiving the right care at the right time, potentially reducing the progression of their conditions and improving their overall health outcomes. In addition to AI-driven diagnostic tools, telemedicine services have emerged as a critical component of modern healthcare management. Telemedicine enables healthcare providers to deliver care remotely, bridging geographical barriers and providing access to medical expertise that might otherwise be unavailable to patients in rural or underserved areas.

Another significant advancement in healthcare management is the utilization of data analytics. Data analytics tools sift through vast amounts of healthcare data, identifying trends, anomalies, and opportunities for improvement. By harnessing the power of data analytics, healthcare organizations can optimize resource allocation, ensuring that the right resources are allocated to the right places and at the right times.

To further streamline healthcare management and coordination, the adoption of electronic health records (EHRs) and interoperability standards has become increasingly prevalent. EHRs digitize patient records, making them easily accessible to authorized healthcare professionals across various facilities. Interoperability standards ensure that these records can be seamlessly shared and integrated into a patient's care journey, regardless of where they receive treatment. The benefits of EHRs and interoperability extend beyond convenience. They enable healthcare providers to have a comprehensive view of a patient's medical history, leading to more informed decision-making and safer patient care.

The efficient sharing of information among providers enhances care coordination, reducing duplicative tests, avoiding adverse drug interactions, and ultimately improving the quality and continuity of care. The integration of advanced technologies into healthcare management has ushered in a new era of accessibility and efficiency. AI-driven diagnostic tools, telemedicine services, data analytics, and interoperable electronic health records have collectively revolutionized the way healthcare is delivered.

5. Discussions

The future of healthcare management is poised to be transformed by the rapid integration of advanced technologies. These technologies, ranging from artificial intelligence (AI) to telemedicine, have already started reshaping the landscape of healthcare, and their potential for further advancement is virtually limitless. This shift towards a more technologically driven healthcare system has the potential to bring about significant improvements in patient care, efficiency, and accessibility. However, it is crucial to acknowledge and address the myriad of challenges and considerations that come with this evolution. One of the most pressing issues that need to be confronted is the matter of privacy and data security. As AI algorithms become increasingly involved in diagnosing and treating medical conditions, vast amounts of sensitive patient data are being collected, analyzed, and stored. This raises legitimate concerns about the confidentiality and security of patient information. Unauthorized access to medical records can lead to identity theft, medical fraud, and other serious breaches of privacy.

Telemedicine, which has gained tremendous popularity, especially in light of the COVID-19 pandemic, presents its own set of challenges. While it offers unprecedented convenience and access to medical care, it also highlights the digital divide and disparities in healthcare access. Many individuals, particularly those in rural or underserved areas, lack the necessary internet connectivity and digital literacy required for effective telemedicine consultations. This divide can exacerbate existing healthcare disparities, as those who are already marginalized may face further barriers to accessing quality healthcare.

Policymakers must work alongside healthcare organizations to bridge this gap by investing in broadband infrastructure, promoting digital education, and ensuring that telemedicine solutions are accessible to all, regardless of socioeconomic status or geographical location. The implementation of advanced technologies in healthcare must be carried out with careful consideration of their impact on existing healthcare disparities. While AI-driven diagnostics and treatments have the potential to enhance healthcare outcomes, they can also inadvertently widen the gap between those who have access to these innovations and those who do not. High-tech treatments and therapies may be expensive, making them inaccessible to disadvantaged populations.

Policymakers and healthcare organizations need to develop strategies that prioritize equitable access to cutting-edge healthcare solutions, ensuring that no one is left behind as technology advances. Collaboration between policymakers, healthcare organizations, and technology developers is paramount in navigating these challenges. Policymakers must establish regulatory frameworks that balance innovation with patient safety and privacy. This includes guidelines for the ethical use of AI in healthcare, clear data protection regulations, and incentives for healthcare organizations to invest in technologies that benefit underserved populations.

Healthcare organizations, on the other hand, need to prioritize patient-centred care, ensuring that the integration of technology enhances the patient experience rather than creating barriers. In addition to addressing privacy, data security, and healthcare disparities, it is crucial to consider the ethical implications of advanced technologies in healthcare. As AI becomes more involved in decision-making processes, questions arise about accountability and transparency. Patients and healthcare professionals must be able to understand and trust the decisions made by AI systems. Ensuring that AI algorithms are explainable and that their recommendations align with established medical standards is essential.

Ongoing training and education for healthcare professionals are imperative to maximize the benefits of these technologies. Professionals need to adapt to the evolving landscape of healthcare, incorporating new tools and techniques into their practices effectively. Continuous learning programs and resources should be made available to empower healthcare workers to make the most of these technological advancements.

The future of healthcare management is undeniably intertwined with advanced technologies. While these technologies offer immense promise in improving patient care, enhancing efficiency, and expanding access, they come with their share of challenges. Privacy concerns, data security issues, healthcare disparities, and ethical considerations must be addressed with urgency and care. Policymakers, healthcare organizations, and technology developers must collaborate to ensure that the integration of technology into healthcare benefits all segments of the population, promotes equity, and upholds the highest standards of patient care and ethical responsibility. Only through such a holistic and inclusive approach can we realize the full potential of advanced technologies in healthcare and create a healthier future for all.

6. Conclusion

The future of healthcare management is bright, with the integration of technologies like Artificial Intelligence (AI), telemedicine, and data analytics playing key roles. Its machine learning algorithms detect patterns that could be overlooked by humans, thus saving lives and resources. Telemedicine facilitates remote consultations and monitoring, overcoming geographical barriers and increasing healthcare access, especially in remote areas. This not only makes healthcare more convenient but also eases the load on physical facilities. Data analytics is crucial, allowing the extraction of insights from patient data for evidence-based decision-making, predictive modelling, and efficient resource allocation. By leveraging big data, healthcare organizations can streamline operations, reduce costs, and offer personalized care. However, this technological advancement comes with responsibilities. It's vital to ensure privacy through strict data protection laws and secure information practices. Healthcare providers should also ensure that AI and telemedicine do not widen healthcare disparities but instead bridge the accessibility gap, particularly for underserved communities.

6.1. Limitations

This study has several limitations. First, the research scope was limited to a specific timeframe, and the findings may not account for long-term developments in healthcare management. Second, the survey and interview data collected may be subject to bias or self-reporting errors. Finally, the study did not investigate the financial implications of implementing advanced technologies in healthcare management.

6.2. Future Scope

Future research should focus on assessing the long-term economic impact of technology integration in healthcare management. Additionally, exploring the ethical and legal aspects of AI and data analytics in healthcare will be crucial. Further investigations into the adoption and acceptance of these technologies by both healthcare providers and patients will also be valuable. Finally, studying the scalability of these innovations in low-resource settings and their potential to address healthcare disparities is an important avenue for future research.

Acknowledgement: I thank my family and friends for supporting my endeavors. Their constant motivation has helped me achieve my goals.

Data Availability Statement: This study uses online benchmark data to conduct the research. This is a fresh study done by the authors.

Funding Statement: No funding has been obtained to help prepare this manuscript and research work.

Conflicts of Interest Statement: No conflicts of interest have been declared by the author(s). This is the authors' fresh work. Citations and references are mentioned as per the used information.

Ethics and Consent Statement: The consent was obtained from the colleges during data collection, and ethical approval and participant consent were received.

References

1. A. Kovari, J. Katona, C. Costescu, "Evaluation of Eye-Movement Metrics in a Software Debugging Task Using Gp3 Eye Tracker," Acta Polytech. Hung., vol. 17, no.3, pp. 57–76, 2020.
2. A. Siddiqi, A. Rajaram, S. Miller, "Do cash transfer programmes yield better health in the first year of life? A systematic review linking low-income/middle-income and high-income contexts," Arch. Dis. Child., vol. 103, no.2, pp. 920–926, 2018.
3. A. Chaudry, C. Wimer, "Poverty is not just an indicator: The relationship between income, poverty, and child well-being," Acad. Pediatrics, vol. 16, no.1, pp. S23–S29, 2016.
4. A. Adhvaryu, J. Fenske, A. Nyshadham, "Early life circumstance and adult mental health," J. Political Econ., vol. 127, no.4, pp. 1516–1549, 2019.
5. P. Bharadwaj, J. Bietenbeck, P. Lundborg, D. O. Rooth, "Birth weight and vulnerability to a macroeconomic crisis," J. Health Econ., vol. 66, no.6, pp. 136–144, 2019.
6. E. Markopoulos, J. Lauronen, M. Luimula, P. Lehto, S. Laukkanen, "Maritime Safety Education with VR Technology (MarSEVR)," in Proceedings of the 2019 10th IEEE International Conference on Cognitive Infocommunications (CogInfoCom), Naples, Italy, pp. 283–288, 2019.
7. G. Bujdosó, O.C. Novac, T. Szimkovics, "Developing Cognitive Processes for Improving Inventive Thinking in System Development Using a Collaborative Virtual Reality System," in Proceedings of the 2017 8th IEEE International Conference on Cognitive Infocommunications (CogInfoCom), Debrecen, Hungary, pp. 79–84, 2017.
8. A.D. Kovács, Z. Kvasznicza, "Use of 3D VR Environment for Educational Administration Efficiency Purposes," in Proceedings of the 2018 9th IEEE International Conference on Cognitive Infocommunications (CogInfoCom), Budapest, Hungary, pp. 361–366, 2018.
9. B. Jiang, J. Li, G. Yue, and H. Song, "Differential privacy for industrial Internet of things: opportunities, applications and challenges," IEEE Internet of Things Journal, vol. 8, no. 1, pp. 1-1, 2021.
10. L. Nie, X. Wang, S. Wang et al., "Network traffic prediction in industrial internet of things backbone networks: a multi-task learning mechanism," IEEE Transactions on Industrial Informatics, vol. 17, no. 11, pp. 7123-7132, 2021.
11. S. Khan and M. Altayar, "Industrial Internet of things: investigation of the applications, issues, and challenges," International Journal of Advances in Applied Sciences, vol. 8, no. 1, pp. 104-113, 2021.
12. R. A. Memon, J. P. Li, M. I. Nazeer, A. N. Khan, and J. Ahmed, "DualFog-IoT: additional fog layer for solving blockchain integration problem in Internet of things," IEEE Access, vol. 7, pp. 169073-169093, 2019.
13. R. Boina, "Assessing the Increasing Rate of Parkinson's Disease in the US and its Prevention Techniques"," International Journal of Biotechnology Research and Development, vol. 3, no. 1, pp. 1–18, 2022.
14. K. Kaur et al., "Comparison between restorative materials for pulpotomised deciduous molars: A randomized clinical study," Children (Basel), vol. 10, no. 2, p. 284, 2023.
15. V. Sharma, A. Kumar, R. Saini, R. Rai, P. Gupta, and P. Sabharwal, "Assessment of pattern of oral prosthetic treatment and prevalence of oral diseases in edentulous patients in North Indian Population: A cross-sectional study," J. Pharm. Bioallied Sci., vol. 13, no. 5, p. 187, 2021.
16. M. J. Saadh et al., "Advances in mesenchymal stem/stromal cell-based therapy and their extracellular vesicles for skin wound healing," Hum. Cell, vol. 36, no. 4, pp. 1253–1264, 2023.
17. D. Saxena, "A Non-Contact Based System to Measure SPO2 and Systolic/Diastolic Blood Pressure using Rgb-Nir Camera." Order No. 29331388, The University of Texas at Arlington, United States -- Texas, 2022.
18. E. Vashishtha and H. Kapoor, "Enhancing patient experience by automating and transforming free text into actionable consumer insights: a natural language processing (NLP) approach," International Journal of Health Sciences and Research, vol. 13, no. 10, pp. 275-288, 2023.
19. K. Shukla, E. Vashishtha, M. Sandhu, and R. Choubey, "Natural Language Processing: Unlocking the Power of Text and Speech Data," Xoffencer International Book Publication House, p. 251, 2023. doi: 10.5281/zenodo.8071056.
20. V. Bansal, S. Pandey, S. K. Shukla, D. Singh, S. A. Rathod and J. L. A. Gonzáles, "A Frame Work of Security Attacks, Issues Classifications and Configuration Strategy for IoT Networks for the Successful Implementation," 2022 5th International Conference on Contemporary Computing and Informatics (IC3I), Uttar Pradesh, India, pp. 1336-1339, 2022, doi: 10.1109/IC3I56241.2022.10073429.

21. V. Gunturu, V. Bansal, M. Sathe, A. Kumar, A. Gehlot and B. Pant, "Wireless Communications Implementation Using Blockchain as Well as Distributed Type of IOT," 2023 International Conference on Artificial Intelligence and Smart Communication (AISC), Greater Noida, India, pp. 979-982, 2023 doi: 10.1109/AISC56616.2023.10085249.
22. V. Suthar, V. Bansal, C. S. Reddy, J. L. A. Gonzáles, D. Singh and D. P. Singh, "Machine Learning Adoption in Blockchain-Based Smart Applications," 2022 5th International Conference on Contemporary Computing and Informatics (IC3I), Uttar Pradesh, India, pp. 372-378, 2022, doi: 10.1109/IC3I56241.2022.10072980.
23. D. Uike, S. Agarwalla, V. Bansal, M. K. Chakravarthi, R. Singh and P. Singh, "Investigating the Role of Block Chain to Secure Identity in IoT for Industrial Automation," 2022 11th International Conference on System Modeling & Advancement in Research Trends (SMART), Moradabad, India, pp. 837-841, 2022. doi: 10.1109/SMART55829.2022.10047385.
24. S. Sonnad, M. Sathe, D. K. Basha, V. Bansal, R. Singh and D. P. Singh, "The Integration of Connectivity and System Integrity Approaches using Internet of Things (IoT) for Enhancing Network Security," 2022 5th International Conference on Contemporary Computing and Informatics (IC3I), Uttar Pradesh, India, pp. 362-366, 2022. doi: 10.1109/IC3I56241.2022.10072475.
25. L. Thapar, "Estimation of Protein Intake on the Basis of Urinary Urea Nitrogen in Patients with Non-Alcoholic Fatty Liver," International Journal for Research in Applied Science and Engineering Technology, vol.44, no.5, pp. 615-628, 2019.
26. L. Kaur and N. Singh, "Effect of mustard oil and process variables extrusion behavior of rice grits (2000)," Journal of Food Science and Technology. Mysore, vol. 37, no.3, pp. 656–660.
27. L. Kaur and S. Shah, "Screening and characterization of cellulose-producing bacterial strains from decaying fruit waste," International Journal of Food and Nutritional Science, vol. 11, no.1, pp. 8–14, 2022.
28. L. Kaur and S. Shah, "Production of bacterial cellulose by Acetobacter tropicalis isolated from decaying apple waste," Asian J. Chem., vol. 34, no. 2, pp. 453–458, 2022.
29. D. S. Das, D. Gangodkar, R. Singh, P. Vijay, A. Bhardwaj and A. Semwal, "Comparative Analysis of Skin Cancer Prediction using Neural Networks and Transfer Learning," 2022 5th International Conference on Contemporary Computing and Informatics (IC3I), Uttar Pradesh, India, pp. 367-371, 2022.
30. A. Bhardwaj, J. Pattnayak, D. Prasad Gangodkar, A. Rana, N. Shilpa and P. Tiwari, "An Integration of Wireless Communications and Artificial Intelligence for Autonomous Vehicles for the Successful Communication to Achieve the Destination," 2023 3rd International Conference on Advance Computing and Innovative Technologies in Engineering (ICACITE), Greater Noida, India, pp. 748-752, 2023, doi: 10.1109/ICACITE57410.2023.10182607.
31. A. Bhardwaj, S. Rebelli, A. Gehlot, K. Pant, J. L. A. Gonzáles and F. A., "Machine learning integration in Communication system for efficient selection of signals," 2023 3rd International Conference on Advance Computing and Innovative Technologies in Engineering (ICACITE), Greater Noida, India, pp. 1529-1533, 2023, doi: 10.1109/ICACITE57410.2023.10182417.
32. R. Dixit, R. P. Schumaker, and M. A. Veronin, 'A Decision Tree Analysis of Opioid and Prescription Drug Interactions Leading to Death Using the FAERS Database', in IIMA/ICITED Joint Conference 2018, India, pp. 67–67, 2018.
33. K. Sekar, P. Manickam Natarajan, and A. Kapasi, "Comparison of arch bar, eyelets and transmucosal screws for maxillo mandibular fixation in jaw fratcure," Biomed. Pharmacol. J., vol. 10, no. 02, pp. 497–508, 2017.
34. M. Senbagavalli and S. K. Singh, "Improving Patient Health in Smart Healthcare Monitoring Systems using IoT," 2022 International Conference on Futuristic Technologies (INCOFT), Belgaum, India, pp. 1-7, 2022, doi: 10.1109/INCOFT55651.2022.10094409.
35. A. Bhardwaj, R. Raman, J. Singh, K. Pant, N. Yamsani and R. Yadav, "Deep Learning-Based MIMO and NOMA Energy Conservation and Sum Data Rate Management System," 2023 3rd International Conference on Advance Computing and Innovative Technologies in Engineering (ICACITE), Greater Noida, India, pp. 866-871, 2023, doi: 10.1109/ICACITE57410.2023.10182714.
36. M. Awais, A. Bhuva, D. Bhuva, S. Fatima, and T. Sadiq, "Optimized DEC: An effective cough detection framework using optimal weighted Features-aided deep Ensemble classifier for COVID-19," Biomed. Signal Process. Control, vol.86, no.9, p. 105026, 2023.
37. A. Veena and S. Gowrishankar, "Healthcare analytics: Overcoming the barriers to health information using machine learning algorithms," in Advances in Intelligent Systems and Computing, Cham: Springer International Publishing, Switzerland, pp. 484–496, 2021.
38. A. Veena and S. Gowrishankar, "Processing of Healthcare Data to Investigate the Correlations and the Anomalies," 2020 Fourth International Conference on I-SMAC (IoT in Social, Mobile, Analytics and Cloud) (I-SMAC), Palladam, India, pp. 611-617, 2020.
39. A. Veena and S. Gowrishankar, "Applications, opportunities, and current challenges in the healthcare industry," in Healthcare 4.0, Boca Raton: Chapman and Hall/CRC, USA, pp. 27–50, 2022.
40. D. R. Bhuva and S. Kumar, "A novel continuous authentication method using biometrics for IOT devices," Internet of Things, vol. 24, no. 9, p. 100927, 2023.

41. D. Bhuva and S. Kumar, "Securing Space Cognitive Communication with Blockchain," 2023 IEEE Cognitive Communications for Aerospace Applications Workshop (CCAAW), Cleveland, OH, 2023, pp. 1-6, USA, doi: 10.1109/CCAAW57883.2023.10219188.
42. V. Bansal, A. Bhardwaj, J. Singh, D. Verma, M. Tiwari and S. Siddi, "Using Artificial Intelligence to Integrate Machine Learning, Fuzzy Logic, and The IOT as A Cybersecurity System," 2023 3rd International Conference on Advance Computing and Innovative Technologies in Engineering (ICACITE), Greater Noida, India, pp. 762-769, 2023, doi: 10.1109/ICACITE57410.2023.10182967.
43. A. Chaturvedi, A. Bhardwaj, D. Singh, B. Pant, J. L. A. Gonzáles and F. A., "Integration of DL on Multi-Carrier Non-Orthogonal Multiple Access System with Simultaneous Wireless Information and Power Transfer," 2022 11th International Conference on System Modeling & Advancement in Research Trends (SMART), Moradabad, India, pp. 640-643, 2022, doi: 10.1109/SMART55829.2022.10046773.
44. A. Uthiramoorthy, A. Bhardwaj, J. Singh, K. Pant, M. Tiwari and J. L. A. Gonzáles, "A Comprehensive review on Data Mining Techniques in managing the Medical Data cloud and its security constraints with the maintained of the communication networks," 2023 International Conference on Artificial Intelligence and Smart Communication (AISC), Greater Noida, India, pp. 618-623, 2023, doi: 10.1109/AISC56616.2023.10085161.
45. A. Veena and S. Gowrishankar, “An automated pre-term prediction system using EHG signal with the aid of deep learning technique,” Multimed. Tools Appl., vol. 83, no. 2, pp. 4093–4113, 2024.
46. A. Veena and S. Gowrishankar, "Context based healthcare informatics system to detect gallstones using deep learning methods," International Journal of Advanced Technology and Engineering Exploration, vol. 9, no. 96, pp. 1661-1677, 2022.
47. M. Senbagavalli and G. T. Arasu, “Opinion Mining for Cardiovascular Disease using Decision Tree based Feature Selection,” Asian J. Res. Soc. Sci. Humanit., vol. 6, no. 8, p. 891, 2016.
48. M. S. Valli and G. T. Arasu, An Efficient Feature Selection Technique of Unsupervised Learning Approach for Analyzing Web Opinions, Journal of Scientific & Industrial Research, vol. 75, no.4, pp. 221-224, 2016.
49. V. R. Umapathy, P. M. Natarajan, and B. Swamikannu, “Review of the role of nanotechnology in overcoming the challenges faced in oral cancer diagnosis and treatment,” Molecules, vol. 28, no. 14, p. 5395, 2023.
50. J. Pei et al., “A comprehensive review on bio-based materials for chronic diabetic wounds,” Molecules, vol. 28, no. 2, p. 604, 2023.
51. P. Natarajan, V. Rekha, A. Murali, and B. Swamikannu, “Newer congeners of doxycycline – do they hold promise for periodontal therapy?,” Arch. Med. Sci. - Civiliz. Dis., vol. 7, no. 1, pp. 16–23, 2022.
52. V. Rekha U, P. Mn, and Bhuminathan., “Review on Anticancer properties of Piperine in Oral cancer: Therapeutic Perspectives,” Res. J. Pharm. Technol., vol.15, no.7, pp. 3338–3342, 2022.
53. V. R. Umapathy et al., “Current trends and future perspectives on dental nanomaterials – An overview of nanotechnology strategies in dentistry,” J. King Saud Univ. Sci., vol. 34, no. 7, p. 102231, 2022.
54. B. Juala Catherine Jebaraj, P. Birla Bose, R. Manickam Natarajan, and A. Gurusamy, “Perception of dental interns on the impact of their gender during training period and future dental practice-cross sectional survey in dental colleges in Chennai,” India. Journal of Positive School Psychology, vol. 2022, no. 5, pp. 1045–1050.
55. M. A. Veronin, R. P. Schumaker, R. R. Dixit, P. Dhake, and M. Ogwo, ‘A systematic approach to’cleaning’of drug name records data in the FAERS database: a case report’, International Journal of Big Data Management, vol. 1, no. 2, pp. 105–118, 2020.
56. R. P. Schumaker, M. A. Veronin, T. Rohm, M. Boyett, and R. R. Dixit, ‘A Data Driven Approach to Profile Potential SARS-CoV-2 Drug Interactions Using TylerADE’, Journal of International Technology and Information Management, vol. 30, no. 3, pp. 108–142, 2021.
57. R. Schumaker, M. Veronin, T. Rohm, R. Dixit, S. Aljawarneh, and J. Lara, ‘An Analysis of Covid-19 Vaccine Allergic Reactions’, Journal of International Technology and Information Management, vol. 30, no. 4, pp. 24–40, 2021.
58. M. A. Veronin, R. P. Schumaker, R. R. Dixit, and H. Elath, ‘Opioids and Frequency Counts in the US Food and Drug Administration Adverse Event Reporting System (FAERS) Database’, Current Aspects in Pharmaceutical Research and Development Vol. 8, pp. 35–43, 2022.
59. R. P. Schumaker, M. A. Veronin, and R. R. Dixit, ‘Determining Mortality Likelihood of Opioid Drug Combinations using Decision Tree Analysis’, 2022, Press.
60. M. A. Veronin, R. P. Schumaker, R. Dixit, and M. Ogwo, ‘Irony of the FAERS Database: An Analysis of Data Input Errors and Potential Consequences’, in IIMA/ICITED Joint Conference 2018, India, pp. 101–116, 2018.
61. R. Schumaker, M. Veronin, R. Dixit, P. Dhake, and D. Manson, ‘Calculating a Severity Score of an Adverse Drug Event Using Machine Learning on the FAERS Database’, in IIMA/ICITED UWS Joint Conference, India, pp. 20–30, 2017.