Bioscene

Bioscene
Volume- 21 Number- 03
ISSN: 1539-2422 (P) 2055-1583 (O)
www.explorebioscene.com

Evaluating Financial Viability and Cost-Effective Strategies for Artificial Intelligence (AI) Integration in Ambulatory Care

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Abstract

Problem: In recent years, the healthcare industry has focused on continuous improvement, but financial integration, like physician practices or hospital ownership, has anti-competitive impacts. The primary aim of the research is to significantly evaluate the financial viability by evaluating physician adoption and cost-effective strategies towards AI integration in ambulatory care. **Approach:** This study followed a method combining financial assessment, quantitative analysis, and descriptive research to assess AI incorporation into "Emergency Health Records (EHR)" in the services of ambulatory care. Additionally, different quantitative methods like regression analysis and hypothesis testing have been used in this research. Applying purposive sampling 232 respondents have been selected for the study. **Findings:** Discussions about cost implications explored a strong positive impact on long-time advantages as well as discussed the return of interest (ROI) and investment barriers. Moreover, the analysis of the financial feasibility plan highlighted positive responses about the financially feasible plans' achievability and cost-saving potential with a focus on collaboration with the experts of financial sectors and cost-benefit analysis. **Conclusion:** This study focused on exploring the significance of incorporating cost-effective techniques and assessing the financial viability of the introduction of AI in the services of ambulatory care. Promoting collaboration between financial experts and clinicians and addressing concerns is necessary for AI's successful incorporation, and there is strong optimism regarding this fact.

Keywords: Ambulatory care; Artificial Intelligence; Emergency Health Records

1. Introduction

In the evolution of the technological world, the healthcare industry focuses on continuous improvement, but financial integration, like physician practices or hospital ownership, has anti-competitive impacts (Adler et al., 2018). The costs associated with the healthcare sectorare continuously increasing, but safety remains a major issue and care quality. Many patients till now deprivedof proper treatment (Khanna et al., 2022). Similarly, the coordination of care remains a vital

concern, and physician burnout is also elevating. To maximize the performance of the health system diverse methods have been implemented (Junaid et al., 2022). Among diverse methods, one popular approach is integrated delivery systems. The authors indicated that uncertainty encompasses the operators of the current changes within the organization, and the healthcare industries are more financially integrated and becoming larger recently (Fisher et al., 2020; Shamszare & Choudhury, 2023). Most physicians and hospitals are currently concentrated on integrated delivery systems (Katsaliaki & Kumar, 2022).

The significance of the diagnosis of diseases, the current arrival of several models of artificial intelligence (AI) raises the chances that clinical decision support depending on the AI remarkably lowers healthcare providers' workload (Alowais et al., 2023; Guo et al., 2020). Moreover, for collecting data during financial resources and time are limited, modern AI models with high accuracy that apply a huge amount of patient features in critical care and emergency medicine are likely impractical. Therefore, the "CoAI (Cost-aware AI)" framework has been developed to solve the problem. The framework allows any AI predictive model, like tree ensemble models, and deep neural networks to provide effective predictions (Erion et al., 2022). Because of attention and time limitations, "in time or- resource-constrained" departments, including critical care and emergency medicine, and their major characteristics are often missing. The providers of "Emergency Medical Service (EMS)" in Washington State from "1995 to 2009" on the trauma incidents scene spent a "median of 16 minutes" (Jones et al., 2023). Additionally, clinicians with their workloads in clinics are assisted by advanced AI technologies. This AI enables them to speed up the augmented decision-making and the treatment process potentially. Apart from that, it also provides more facilities for clinicians to have more personal time and space with patients. Finally, other studies suggested that in healthcare, AI emphasizes exploring the advanced algorithms' and computational techniques' power to interpret and analyze complex and extensive clinical datasets that help in clinical decision-making systematically (Albahri et al., 2023). The primary aim of the research is to significantly evaluate the financial viability by evaluating physician adoption and cost-effective strategies towards AI integration in ambulatory care.

2. Materials and Methods

This study employs a descriptive research design to develop a financially viable plan for integrating AI into Electronic Health Records (EHR). The methodology incorporates financial assessments, quantitative analyses, and descriptive research to document and explore the nature of AI integration in ambulatory care services.

2.1 Data Sampling and Research Design

A purposive sampling method was utilized to select research participants (Campbell et al., 2020) . This approach targets individuals with specific skills and knowledge relevant to the research questions. The Raosoft sample size calculator was used to estimate the sample size based on established criteria (Raosoft. inc, 2004). The study population in India consists of 580 individuals representing emergency ambulance services. A margin of error of 5% was deemed acceptable for this research, while a confidence level of 95% was maintained to ensure that the sample accurately reflects the population. Ultimately, 232 participants were chosen for the study.

2.2 Objectives of the Research

The primary objectives of this study are:

- To evaluate the costs associated with implementing AI in ambulatory care.
- To identify the most financially feasible plan for deploying AI systems.

2.3 Collection of Data

Data collection was conducted through a cross-sectional survey, guided by ethical considerations. A 5-point Likert scale was employed to enhance the depth and accuracy of the data collected.

2.4 Ethical Considerations

Participants were informed about the research objectives and their rights through informed consent, ensuring adherence to ethical standards. The study prioritizes the privacy, anonymity, and confidentiality of participants, in line with ethical guidelines.

2.5 Data Analysis and Validation

Quantitative methods were applied to analyze the use of AI in ambulatory care services, contributing to the development of healthcare policies and decision-making. Ensuring validity and reliability is crucial in research to confirm that the measurement tool accurately reflects the intended constructs and that the results are consistent (Farrokhi et al., 2023). This study utilizes a 5-point Likert scale questionnaire to evaluate the financial impact of AI in India's ambulance services, aiming to uphold the validity and reliability of the findings.

3. Results

3.1 Demographic Details of Participants

Let's take a look at who participated in the study. The table below shows the information we gathered about the participants.

Table 1: Demographic details of participants

S. No	Variable	Frequency	Percentage
1	**Age group (years)**		
	< 30	137	51.7%
	31-40	96	36.2%
	>40	32	12.1%
2	**Gender**		
	Male	193	72.8%
	Female	72	27.2%
3	**Educational level**		
	Bachelor	132	49.8%
	Master	127	47.9%
	Doctoral or PhD	6	2.3%

More than half of the participants in the study were under 30 years old, at 51.7%. Out of all the participants, 27.2% were female and 72.8% were male. Almost half of the participants, 49.8%, had a Bachelor's degree or an equivalent level of education. This means that a lot of young people took part, more male participants than females, and most of them had completed their undergraduate studies.

3.2 Analysis of involved cost in implementing AI in ambulatory care

This section explains how AI is being used in ambulatory care settings, with a table providing relevant information.

Table 2: Associated cost in AI implementation

S. N	Likert scale items*	1 = SD	2 = D	3 = N	4 = A	5 = SA	Mean	Median
1	Do you think the initial investment required for AI implementation in ambulatory care is justified by the long-term benefits?	3 (1.13%)	9 (3.40%)	7 (2.64%)	120 (45.28%)	126 (47.55%)	19.55	9
2	Does AI implementation in ambulatory care lead to improved operational efficiency?	7 (2.64%)	4 (1.51%)	19 (7.17%)	99 (37.36%)	136 (51.32%)	23.49	19
3	Do you think the use of AI in ambulatory care results in lower overall healthcare costs?	6 (2.26%)	8 (3.02%)	5 (1.89%)	103 (38.87%)	143 (53.96%)	20.40	8
4	Does AI implementation in ambulatory care	2 (0.75%)	8 (3.02%)	13 (4.91%)	103 (38.87%)	139 (52.45%)	19.71	13

	contribute to better patient health outcomes?							
5	Do you think the initial cost of AI implementation in ambulatory care can be a barrier for some healthcare facilities?	9 (3.40%)	4 (1.51%)	22 (8.30%)	116 (43.77%)	114 (43.02%)	25.35	22
6	Do you think some healthcare organizations may struggle to allocate a budget for AI implementation in ambulatory care?	2 (0.75%)	12 (4.53%)	20 (7.55%)	109 (41.13%)	122 (46.04%)	22.96	20
7	Do you think concerns about the return on investment (ROI) may affect the decision to implement AI in ambulatory care?	1 (0.38%)	12 (4.53%)	8 (3.02%)	112 (42.26%)	132 (49.81%)	16.99	12
8	Overall, do you believe that the implementation of AI in ambulatory care is a cost-effective investment for healthcare organizations?	5 (1.89%)	9 (3.40%)	14 (5.28%)	100 (37.74%)	137 (51.70%)	24.39	14
*Note: {1, Strongly Disagree}; {2, Disagree}; {3, Neutral}; {4, Agree}; {5, Strongly Agree}								

Majority of participants, almost 92.83%, believe that initial investing in AI for ambulatory care offers long-term benefits. Positive attitudes towards AI incorporation were reflected in median scores of 9 and mean scores of 19.55. 88.68% acknowledged that AI improves operational efficiency, with only 2.64% disagreeing. However, 23.50 mean scores and 19 median scores indicate a better perception regarding the fact. Participants also believed AI integration leads to decreased healthcare costs, with 53.96% agreeing and 38.87% neutral. The positive perception towards cost reduction was evidenced by median scores of 20.40 and mean scores of 8. 52.45% reported AI improves patient health outcomes, while 38.87% were neutral. Moreover, 19.71 mean scores and 13 median scores highlight positive thinking with some neutrality. Concerns were

raised over the initial cost of AI implementation by 43.77% of participants.Therefore, 22 median scores and 25.35 mean values also suggest the same.

Almost half of the people surveyed think that some healthcare institutions face huge obstacles for budget allocation to use AI. Scores of20 median and 22.96 mean illustrate a notable concern. Almost half of the people also think that concerns about ROI hamper the AI implementation's decision. The 12 median and 19.99 mean scores show that people are really worried about making a profit. But more than half of the people think that using AI in healthcare can actually make profits. The 24.39 mean and 14 median scores show that people are feeling positive about cost-effectiveness. So, even though using AI in ambulatory care can be really helpful, it's important to focusing on ROI, budget allocation and initial cost is mandatory.

3.3 Analysis of the most financially feasible plan for implementing the AI systems

The table shows data on how AI is used in ambulatory care, focusing on financial feasibility, cost savings, and considerations for its implementation.

Table 3: Most cost-effective plan for AI system implementation

S. N	Likert scale items*	1 = SD	2 = D	3 = N	4 = A	5 = SA	Mean	Median
1	Do you believe that implementing AI systems in ambulatory care can result in cost savings?	15 (5.66%)	11 (4.15%)	11 (4015%)	76 (28.68%)	152 (57.36%)	29.13	15
2	Do you think are you confident that a financially feasible plan for AI implementation can be developed?	13 (4.91%)	14 (5.28%)	17 (6.42%)	43 (16.23%)	178 (67.17%)	29.85	17
3	Does the potential benefits of AI integration in ambulatory care outweigh the associated costs?	9 (3.40%)	12 (4.53%)	31 (11.70%)	91 (34.34%)	122 (46.04%)	32.66	31
4	Do you feel that you are aware of the financial considerations and factors that need to be addressed when planning AI implementation?	10 (3.77%)	15 (5.66%)	29 (10.94%)	84 (31.70%)	127 (47.92%)	34.14	29

5	Is the cost-benefit analysis a valuable tool for evaluating the financial feasibility of AI implementation?	6 (2.26%)	8 (3.02%)	17 (6.42%)	91 (34.34%)	143 (53.96%)	25.422	17
6	Do you think comprehensive cost-benefit analysis should consider both short-term and long-term financial implications?	5 (1.89%)	13 (4.91%)	22 (8.30%)	83 (31.32%)	142 (53.58%)	27.88	22
7	Do healthcare institutions should allocate a dedicated budget for AI implementation in ambulatory care?	5 (1.89%)	16 (6.04%)	11 (4.15%)	76 (28.68%)	157 (59.25%)	25.36	16
8	Do you think collaboration with financial experts or consultants is essential for developing a financially feasible plan for AI integration?	7 (2.64%)	10 (3.77%)	40 (15.09%)	87 (32.83%)	121 (45.66%)	31.18	40
9	Overall, do you believe that a financially feasible plan for AI implementation in ambulatory care is achievable?	8 (3.02%)	10 (3.77%)	26 (9.81%)	76 (28.68%)	145 (54.72%)	29.65	26
*Note: {1, Strongly Disagree}; {2, Disagree}; {3, Neutral}; {4, Agree}; {5, Strongly Agree}								

Majority of participants (57.36%) believe that implementing AI systems in ambulatory care can lead to cost savings. Additionally, 67.17% of participants emphasize the importance of having a cost-effective plan for incorporating AI technology. Feasible plans is high, with 17 median and 29.85 mean scores indicating strong support. Some participants (46.04%) see the potential advantages of AI integration as outweighing the associated costs, while others (34.34%) remain neutral on this topic. Nearly half of the participants (47.92%) express a sincere interest in considering the financial implications of implementing AI technology in their ambulatory care practices. Therefore, 29 median and 34.14 mean values have high financial awareness. In addition,

53.58% believe that an effective cost-benefit analysis considers both long and short-term financial incorporation. Over half of respondents believe that cost-benefit analysis and financial feasibility of AI implementations is an important tool which is support by 17 median and 25.42 mean scores. The majority also agree that both long and short-term financial considerations should be taken into account, and that dedicated budgets are necessary for implementing AI in healthcare institutions. Collaboration with financial experts is seen as essential for establishing a cost-effective plan for AI incorporation, with strong agreement on this point. Additionally, many participants believe that a cost-benefit plan is achievable in ambulatory care settings, highlighting the potential for cost-savings with AI implementation in healthcare services.

4. Discussion

4.1 Involving cost in AI implementation in Ambulatory care

In the past decade, Artificial Intelligence (AI) has seen significant growth in the healthcare industry, with AI tools being used to analyze medical data and assist healthcare providers in various clinical tasks. The global health AI market is projected to reach $6.6 billion by 2021 and is expected to grow tenfold in the next five years (Väänänen et al., 2021). Investing in AI applications has a positive financial impact on the healthcare industry, benefiting medical technology, insurers, and patients (Yin et al., 2021). While the financial influence of AI in healthcare has been sporadically studied, it is essential to consider both direct and indirect costs in implementing AI solutions in ambulatory care (Yuan et al., 2022).

Implementing AI in ambulatory care is costly and relies on quality data for success (Albahri et al., 2023). The healthcare industry incurs significant expenses in organizing, cleaning, and collecting healthcare data for AI implementation. To keep AI systems performing at their best, regular upgrades, maintenance, and monitoring are essential to stay connected with technological advancements (Becker et al., 2022). In the medical field, these ongoing costs remarkably come up with the AI implementations' total cost. Implementing AI in the medical field requires significant investments in networking infrastructure, hardware, and software to support data storage and processing power (Subrahmanya et al., 2022). This leads to major expenses as existing systems need to be integrated with AI technologies, requiring extra resources. Healthcare data is sensitive, and robust cybersecurity is essential. The study identified that maintaining compliance with the data protection standards of healthcare and implementing secure systems requires large investments that contribute to the entire expense (Messinis et al., 2024). Training healthcare staff on AI applications is crucial for secure systems. Researchers stated that this involves ongoing education to stay with improvements, updates, and basic training during implementation (Umamaheswaran et al., 2022). In AI implementation, ensuring conformity with the laws of healthcare and meeting regulatory standards adds extra cost. To

navigate the complicated landscape of regulation, healthcare industries involve employing legal experts (Ahmad et al., 2023). Finally, in healthcare, the AI implementation cost is a multidisciplinary consideration surrounding ongoing maintenance, security, compliance, training, and technology.

Moreover, the above description highlights a positive and strong acceptance of AI implementation in the settings of ambulatory care. Additionally, the concern encompassing ROI and initial investment aligns with results in existing academic studies. They stated that healthcare institutions experience issues with bearing AI integration costs due to uncertainties covering long-term benefits and ROI (Rana & Shuford, 2024). However, this uncertainty impedes the processes of decision-making, specifically in resource-limited scenarios. AI implement-related issues needs clear communication strategies and cost-benefit analyses to illustrate the AI adoption's value proposition. To validate the AI technologies' efficiency in providing tangible advantages, rigorous evaluation and real-world implementations are necessary (Holdsworth et al., 2021) . Similarly, concerns about budget allocation and financial barriers align with studies indicating the economic complexities related to the adoption of AI in healthcare. The necessity for strategic planning and a proper financial model to confirm equitable access and address budgetary constraints to AI technologies. However, for mitigating financial risks and optimizing resource allocation related to the incorporations of AI; collaborative approaches are mandatory that involve stakeholders from clinical domains, IT, and finance. They suggested that the interventions of AI can improve healthcare outcomes and yield remarkable cost savings across different domains. Therefore, AI intervention needs continuous monitoring, robust governance frameworks, and strategic planning to confirm AI's sustainable integration into clinical practice (Zhou et al., 2024).

4.2 Identifying the most appropriate cost-effective plans for AI system implementation

Currently, the industry of healthcare is now experiencing issues of attracting and retaining customers with low cost and great facilities which carries a huge quantity of workload. Therefore, sometimes the research compromises their "personal life" (DiPiro et al., 2023). Apart from that, for patients and enterprises increase in the pharmaceutical drugs' price has created a big issue. Use of artificial intelligence for the diagnosis and treatment of diseases can be cost-effective and easier (Senthilkumar et al., 2023). Recently, many organizations have applied AI and machine learning in the diagnosis of all diseases (Qazi et al., 2021). All the transactions of the payments are easily managed by this AI tool. Through AI the physical and mental health conditions of the patients are easily diagnosed (Hee Lee & Yoon, 2021). Thus, AI and machine learning help ambulatory care services to reach a noticeable position. AI implementation requires a cost-effective and meticulous plan to ensure cutting-edge technology's effective deployment without straining the resources of the economy (Badidi, 2023). In AI implementation, budgeting has an influential role. Moreover, making

a proper budget involves cost estimation across different dimensions like scalability, maintenance, integration, security, compliance, training, data management, software development, and technology infrastructure (Rane et al., 2023).

According to the study, confirming cost-effectiveness, vendor negotiation, and selection are important steps (McFarlane et al., 2021). Ambulatory care providers need to discover different providers of AI solutions by negotiating contracts that provide more favorable terms that offer flexible payment structures and reduce upfront costs. The study investigated that organizations implement AI solutions that are open-source which lowers the expense of licensing significantly (Lins et al., 2021). Researches noted that organizations actively search for external funding through collaborative ventures, partnerships, and grants, while internal budgets cover a limited portion of the costs (Clark et al., 2021). In ambulatory services, to deal with unexpected challenges or costs that develop during implementation, financial contingency plays a key role. Moreover, the reseracherssuggested that investing in human resources and training is another part where a cost-effective plan creates a notable difference (Wen & Zheng, 2021). Using internal talent reduces hiring costs and fosters an easy transition for employees. Particularly in healthcare, compliance, and security are considered AI implementation's non-negotiable aspects by best practices and cost-effective solutions to ensure the protection of data by robust cybersecurity (Al Kuwaiti et al., 2023). In the long-term aspect, ongoing upgrades and maintenance are necessary for the healthcare industry. AI solutions that offer profit-making packages of maintenance that spread the burden of the economy over time, while it is important to provide funds for periodic enhancements and continuous monitoring (Chen, 2022). For implementing the AI system in healthcare, a cost-effective plan is important that needs a targeted, phased, and strategic approach. They explored that organizations can maximize AI's power without compromising the sustainability of the economy by managing ongoing costs carefully (Wirtz et al., 2023). Finally, the key indicates a balance between fiscal responsibility and innovation that ensures AI's advantages are increased without extreme economic strain.

Additionally, the analysis of collected data exhibited many important aspects of the AI systems' implementation in the settings of ambulatory care, specifically emphasizing the requirement of comprehensive planning, financial feasibility, and cost savings. The technologies of AI reduce operational costs, streamline processes, and optimize resource utilization in the settings of healthcare (Alami et al., 2021). Thus, this study indicates a positive attitude towards cost-saving ability. Additionally, AI-generated predictive analytics prevent readmissions, minimize unnecessary procedures, and enhance resource allocations that result in cost containment. Apart from that, for AI implementation, to establish financially feasible plans; confidence is necessary that echoes with study that indicate the significance of effective financial strategies and models to

support AI's sustainable adoption in the settings of healthcare (Khanijahani et al., 2022). In this process, using cost-benefit analysis techniques and collaborating with the experts are regarded as necessary steps. It confirms that in AI, investment aligns with the goals of the organization and yields tangible returns. Additionally, a need for guidance and future research on the complexities of implementing AI including addressing possible barriers like staff training requirements and initial investment costs and understanding the sustainable financial applications (Li et al., 2020). Healthcare organizations by using evidence-based practices, increasing financial knowledge among all participating stakeholders, and addressing concerns improve the ability of AI to drive sustainable delivery of healthcare, increase efficiency, and maximize patient outcomes.

5. Conclusion

Finally, for the sustainable transformation of healthcare, financial feasibility, and cost-effective strategies are essential. In addition, the discussion about the physician perspectives exhibited a positive viewpoint on AI implementation, with financial feasibility and potential cost-savings related to the technologies of AI. Moreover, healthcare organizations to confirm the successful incorporation of AI always focus on cost-benefit evaluation that highlights both long-term and short-term financial implications. Promoting collaborations between financial experts and clinicians and allocating necessary budgets for implementing AI are important steps towards maximizing the ROI and meeting financial sustainability. Thus, using current advancements in evidence-based practices and health informatics mitigates possible financial risks and guides the processes of decision-making. Healthcare stakeholders by following a technique to incorporate cost-effective strategies and evaluating financial viability harness the AI's transformative power to drive organizational efficiency, optimize resource utilization, and enhance patient care in the settings of ambulatory care. So, these strategies not only helped in AI technology incorporation but also offered the path for a more adaptive and resilient ecosystem of healthcare during evolving opportunities and challenges. Thus, a financially feasible plan is necessary for this ever-changing landscape of healthcare.

6. References

1. Adler, L., Yi, D., Li, M., McBroom, B., Hauck, L., Sammer, C., Jones, C., Shaw, T., & Classen, D. (2018). Impact of Inpatient Harms on Hospital Finances and Patient Clinical Outcomes. Journal of Patient Safety.
2. Ahmad, A., Tariq, A., Hussain, H. K., & Yousaf Gill, A. (2023). Revolutionizing Healthcare: How Deep Learning is poised to Change the Landscape of Medical Diagnosis and Treatment. Journal of Computer Networks, Architecture and High Performance Computing.
3. Al Kuwaiti, A., Nazer, K., Al-Reedy, A., Al-Shehri, S., Al-Muhanna, A.,

Subbarayalu, A. V., Al Muhanna, D., & Al-Muhanna, F. A. (2023). A Review of the Role of Artificial Intelligence in Healthcare. In Journal of Personalized Medicine.

4. Alami, I., Dixon, A. D., & Mawdsley, E. (2021). State Capitalism and the New Global D/development Regime. Antipode.
5. Albahri, A. S., Duhaim, A. M., Fadhel, M. A., Alnoor, A., Baqer, N. S., Alzubaidi, L., Albahri, O. S., Alamoodi, A. H., Bai, J., Salhi, A., Santamaría, J., Ouyang, C., Gupta, A., Gu, Y., & Deveci, M. (2023). A systematic review of trustworthy and explainable artificial intelligence in healthcare: Assessment of quality, bias risk, and data fusion. Information Fusion.
6. Alowais, S. A., Alghamdi, S. S., Alsuhebany, N., Alqahtani, T., Alshaya, A. I., Almohareb, S. N., Aldairem, A., Alrashed, M., Bin Saleh, K., Badreldin, H. A., Al Yami, M. S., Al Harbi, S., & Albekairy, A. M. (2023). Revolutionizing healthcare: the role of artificial intelligence in clinical practice. In BMC Medical Education.
7. Badidi, E. (2023). Edge AI for Early Detection of Chronic Diseases and the Spread of Infectious Diseases: Opportunities, Challenges, and Future Directions. In Future Internet.
8. Becker, N. V., Karmakar, M., Tipirneni, R., & Ayanian, J. Z. (2022). Trends in Hospitalizations for Ambulatory Care-Sensitive Conditions during the COVID-19 Pandemic. JAMA Network Open.
9. Campbell, S., Greenwood, M., Prior, S., Shearer, T., Walkem, K., Young, S., Bywaters, D., & Walker, K. (2020). Purposive sampling: complex or simple? Research case examples. Journal of Research in Nursing.
10. Chen, N. (2022). Stakeholder Power Analysis of the Facilitators and Barriers for Telehealth Solution Implementation in China: A Qualitative Study of Individual Users in Beijing and Interviews with Institutional Stakeholders. JMIR Formative Research.
11. Clark, C. R., Wilkins, C. H., Rodriguez, J. A., Preininger, A. M., Harris, J., DesAutels, S., Karunakaram, H., Rhee, K., Bates, D. W., & Dankwa-Mullan, I. (2021). Health Care Equity in the Use of Advanced Analytics and Artificial Intelligence Technologies in Primary Care. In Journal of General Internal Medicine.
12. DiPiro, N. D., Murday, D., & Krause, J. S. (2023). Differences in personal characteristics and health outcomes between ambulatory and non-ambulatory adults with traumatic spinal cord injury. Journal of Spinal Cord Medicine.
13. Erion, G., Janizek, J. D., Hudelson, C., Utarnachitt, R. B., McCoy, A. M., Sayre, M. R., White, N. J., & Lee, S. I. (2022). CoAI: Cost-Aware Artificial Intelligence for Health Care. Nature Biomedical Engineering.
14. Farrokhi, P., Zarei, E., Bagherzadeh, R., Irannejad, B., & Hashjin, A. A. (2023). Development and validation of primary health care quality assessment tool. BMC Health Services Research.

15. Fisher, E. S., Shortell, S. M., O'malley, A. J., Fraze, T. K., Wood, A., Palm, M., Colla, C. H., Rosenthal, M. B., Rodriguez, H. P., Lewis, V. A., Woloshin, S., Shah, N., & Meara, E. (2020). Financial integration's impact on care delivery and payment reforms: A survey of hospitals and physician practices. Health Affairs.
16. Guo, Y., Hao, Z., Zhao, S., Gong, J., & Yang, F. (2020). Artificial intelligence in health care: Bibliometric analysis. Journal of Medical Internet Research.
17. Hee Lee, D., & Yoon, S. N. (2021). Application of artificial intelligence-based technologies in the healthcare industry: Opportunities and challenges. International Journal of Environmental Research and Public Health.
18. Holdsworth, L. M., Park, C., Asch, S. M., & Lin, S. (2021). Technology-enabled and artificial intelligence support for pre-visit planning in ambulatory care: Findings from an environmental scan. Annals of Family Medicine.
19. Jones, A. R., Miller, J., & Brown, M. (2023). Epidemiology of Trauma-Related Hemorrhage and Time to Definitive Care Across North America: Making the Case for Bleeding Control Education. Prehospital and Disaster Medicine.
20. Junaid, S. B., Imam, A. A., Balogun, A. O., De Silva, L. C., Surakat, Y. A., Kumar, G., Abdulkarim, M., Shuaibu, A. N., Garba, A., Sahalu, Y., Mohammed, A., Mohammed, T. Y., Abdulkadir, B. A., Abba, A. A., Kakumi, N. A. I., & Mahamad, S. (2022). Recent Advancements in Emerging Technologies for Healthcare Management Systems: A Survey. In Healthcare (Switzerland).
21. Katsaliaki, K., & Kumar, S. (2022). The Past, Present, and Future of the Healthcare Delivery System Through Digitalization. IEEE Engineering Management Review.
22. Khanijahani, A., Iezadi, S., Dudley, S., Goettler, M., Kroetsch, P., & Wise, J. (2022). Organizational, professional, and patient characteristics associated with artificial intelligence adoption in healthcare: A systematic review. In Health Policy and Technology.
23. Khanna, N. N., Maindarkar, M. A., Viswanathan, V., Fernandes, J. F. E., Paul, S., Bhagawati, M., Ahluwalia, P., Ruzsa, Z., Sharma, A., Kolluri, R., Singh, I. M., Laird, J. R., Fatemi, M., Alizad, A., Saba, L., Agarwal, V., Sharma, A., Teji, J. S., Al-Maini, M., … Suri, J. S. (2022). Economics of Artificial Intelligence in Healthcare: Diagnosis vs. Treatment. Healthcare (Switzerland).
24. Li, R. C., Asch, S. M., & Shah, N. H. (2020). Developing a delivery science for artificial intelligence in healthcare. In npj Digital Medicine.
25. Lins, S., Pandl, K. D., Teigeler, H., Thiebes, S., Bayer, C., & Sunyaev, A. (2021). Artificial Intelligence as a Service: Classification and Research Directions. Business and Information Systems Engineering.
26. McFarlane, K. H., Cahan, E. M., Chawla, A., Lee, J., Nguyen, L., Rajagopalan, V., Hu, S. S., Ratliff, J. K., Vorhies, J. S., Imrie, M. N., Rinsky, L. A., Frick, S. L., Wall, J. K., & Shea, K. G. (2021). Using Data-Driven, Principled Negotiation With a Clinician-Integrated Approach to Achieve Best Values on Spinal Implants. Journal of the Pediatric Orthopaedic Society of North America.

27. Messinis, S., Temenos, N., Protonotarios, N. E., Rallis, I., Kalogeras, D., & Doulamis, N. (2024). Enhancing Internet of Medical Things security with artificial intelligence: A comprehensive review. In Computers in Biology and Medicine.
28. Qazi, S., Raza, K., & Iqbal, N. (2021). 5 Artificial intelligence in medicine (AIM): machine learning in cancer diagnosis, prognosis and therapy. In Artificial Intelligence for Data-Driven Medical Diagnosis.
29. Rana, M. S., & Shuford, J. (2024). AI in Healthcare: Transforming Patient Care through Predictive Analytics and Decision Support Systems. Journal of Artificial Intelligence General Science (JAIGS) ISSN:3006-4023.
30. Rane, N., Choudhary, S., & Rane, J. (2023). Integrating ChatGPT, Bard, and leading-edge generative artificial intelligence in building and construction industry: applications, framework, challenges, and future scope. SSRN Electronic Journal.
31. Senthilkumar, T., Arumugam, T., Pandurangan, H., & Panjaiyan, K. (2023). Adoption of Artificial Intelligence in Health Care: A Nursing Perspective. Salud, Ciencia y Tecnologia.
32. Shamszare, H., & Choudhury, A. (2023). Clinicians' Perceptions of Artificial Intelligence: Focus on Workload, Risk, Trust, Clinical Decision Making, and Clinical Integration. Healthcare (Switzerland).
33. Subrahmanya, S. V. G., Shetty, D. K., Patil, V., Hameed, B. M. Z., Paul, R., Smriti, K., Naik, N., & Somani, B. K. (2022). The role of data science in healthcare advancements: applications, benefits, and future prospects. In Irish Journal of Medical Science.
34. Umamaheswaran, S. K., Gehlot, A., Singh, B., Alanya-Beltran, J., Dixit, N., & Bansal, R. (2022). Integrated Artificial Intelligence System with existing system for Predicting the Disease. Proceedings of the 2022 International Conference on Innovative Computing, Intelligent Communication and Smart Electrical Systems, ICSES 2022.
35. Väänänen, A., Haataja, K., Vehviläinen-Julkunen, K., & Toivanen, P. (2021). AI in healthcare: A narrative review. F1000Research.
36. Wen, X., & Zheng, Y. (2021). The Application of Artificial Intelligence Technology in Cloud Computing Environment Resources. Journal of Web Engineering.
37. Wirtz, J., Hofmeister, J., Chew, P. Y. P., & Ding, X. (2023). Digital service technologies, service robots, AI, and the strategic pathways to cost-effective service excellence. Service Industries Journal.
38. Yin, J., Ngiam, K. Y., & Teo, H. H. (2021). Role of artificial intelligence applications in real-life clinical practice: Systematic review. In Journal of Medical Internet Research.
39. Yuan, C. T., Dy, S. M., Yuanhong Lai, A., Oberlander, T., Hannum, S. M., Lasser, E. C., Heughan, J. A., Dukhanin, V., Kharrazi, H., Kim, J. M., Gurses, A. P., Bittle, M., Scholle, S. H., & Marsteller, J. A. (2022). Challenges and Strategies for

Patient Safety in Primary Care: A Qualitative Study. American Journal of Medical Quality.

40. Zhou, B., Yang, G., Shi, Z., & Ma, S. (2024). Natural Language Processing for Smart Healthcare. IEEE Reviews in Biomedical Engineering.