Jordan Journal of Pharmaceutical Sciences, Volume 18, No. 3, 2025

AI's Healing Touch: Transforming Healthcare from Diagnosis to Recovery

C.Sowjanya[1], Shaik Shakir Basha[1*], M. Sainath Yadav[1]

[1]Department of Pharmaceutical Analysis, Raghavendra Institute of Pharmaceutical Education and Research, K.R Palli cross, Chiyyedu, Ananthapuramu-515721(AP).

ABSTRACT

Artificial intelligence (AI) is transforming healthcare by enhancing diagnostic accuracy, personalizing treatment, and improving patient care. This review explores the key applications of AI, including predictive analytics, machine learning, and telemedicine, which contribute to better patient outcomes, increased operational efficiency, and cost reductions. Despite these benefits, challenges such as data privacy, algorithmic bias, and regulatory compliance persist. The review emphasizes the need for healthcare professionals to receive adequate training to effectively utilize AI technologies. Addressing these challenges is essential to realizing AI's full potential in providing personalized and efficient healthcare.

Keywords: Artificial Intelligence (AI), Predictive Analytics, Telemedicine, Algorithmic Bias, Healthcare Efficiency

INTRODUCTION

Artificial Intelligence (AI) is significantly transforming the healthcare sector, revolutionizing multiple aspects of medical practice, from diagnostics to patient care and recovery [1]. By leveraging its capacity to rapidly and accurately analyze vast amounts of data, AI enables healthcare providers to make more informed decisions, enhance diagnostic precision, personalize treatment plans, and optimize patient outcomes [2]. This technological advancement is improving operational efficiency, patient outcomes, and cost management, positioning AI as a pivotal force in modern healthcare [3].

AI's impact on healthcare is particularly profound in diagnostics, where advanced algorithms can detect subtle patterns indicative of diseases such as cancer and cardiovascular conditions—often earlier than traditional methods [4]. For example, the CheXNeXt algorithm, designed to interpret chest X-rays, has demonstrated diagnostic accuracy comparable to that of human radiologists, facilitating earlier detection and intervention, which is critical for improving patient prognosis [5]. AI's ability to enhance diagnostic accuracy is reshaping the future of disease management, enabling timely and precise interventions.

Beyond diagnostics, AI is revolutionizing treatment and recovery processes. By analyzing patient data, AI enhances personalized medicine, allowing for the customization of treatment plans tailored to individual patient needs [6]. Machine learning models predict patient responses to various therapies, enabling more precise and effective interventions [7]. Additionally, AI accelerates drug discovery by identifying potential new treatments more efficiently than traditional methods, thus advancing medical research and expanding treatment options [8]. During the recovery phase, AI technologies such as remote monitoring devices and virtual health assistants provide continuous support to patients, tracking vital signs and offering personalized health information and reminders.

***Corresponding author: Shaik Shakir Basha**
shakirbasha72@gmail.com
Received: 07/08/2024 Accepted: 21/09/2024.
DOI: https://doi.org/10.35516/jjps.v18i3.3120

 © 2025 DSR Publishers/The University of Jordan. All Rights Reserved.

This helps maintain adherence to treatment plans and improves overall care quality [9].

However, the integration of AI in healthcare is not without challenges, particularly concerning ethical considerations. One significant concern is algorithmic bias, where biases in the training data can perpetuate or even exacerbate existing healthcare disparities. Addressing this issue requires the development of bias detection tools and the use of more diverse datasets to ensure fairness and equity in AI-driven healthcare decisions [10]. Additionally, data privacy and security are critical concerns as AI systems rely on vast amounts of sensitive patient information. Ensuring compliance with regulations such as the Health Insurance Portability and Accountability Act (HIPAA) and the General Data Protection Regulation (GDPR) is essential, although these frameworks have limitations and need to evolve to address the unique challenges posed by AI technologies [11].

AI is also transforming healthcare delivery through advancements in telemedicine and virtual consultations. AI-powered systems optimize resource utilization, appointment scheduling, and service quality, making healthcare more accessible and efficient [12]. By integrating AI into telemedicine, healthcare providers can deliver more effective care while reducing operational costs [13]. The integration of AI into healthcare systems is driving significant advancements across multiple areas. From enhancing diagnostic accuracy and personalizing treatment to supporting recovery and improving healthcare delivery, AI's transformative potential is reshaping the future of medical practice [14]. As technology progresses, AI is poised to play an increasingly central role in improving patient care and advancing medical knowledge [15].

Rigorous validation is necessary to ensure reliable AI insights, and addressing algorithmic bias is crucial to prevent healthcare disparities. Integrating AI into clinical workflows requires infrastructure changes and training for healthcare professionals [16]. Despite these challenges, AI significantly enhances patient care, operational efficiency, and innovative treatments. Ongoing research, ethical oversight, and collaboration are essential to fully realize AI's potential while mitigating risks [17]. To further illustrate the impact and effectiveness of AI models in healthcare, the following section discusses real-life cases where AI has been successfully implemented. These examples highlight the transformative potential of AI in various healthcare settings, showcasing improvements in diagnosis, treatment, patient management, and operational efficiency.

Table 1: Real-Life Cases of AI Implementation in Healthcare

AI Application	Case example	Outcome	Insights	References
AI in Diagnostics	**CheXNeXt Algorithm** for Chest X-Ray Interpretation: Stanford University developed an AI model, CheXNeXt, to interpret chest X-rays and diagnose 14 different pathologies	-CheXNeXt demonstrated diagnostic accuracy comparable to that of expert radiologists. - The model enabled faster and more consistent interpretation of X-rays, reducing diagnostic errors and improving patient outcomes.	-AI models like CheXNeXt can enhance radiologists' capabilities by providing a second opinion, especially in areas with a shortage of healthcare professionals. -AI can improve diagnostic accuracy and reduce the workload on radiologists, allowing them to focus on more complex cases.	[5]

AI Application	Case example	Outcome	Insights	References
AI in Drug Discovery	**BenevolentAI** in ALS Treatment Development: Benevolent AI used machine learning algorithms to analyse biomedical data and identify a potential treatment for amyotrophic lateral sclerosis (ALS)	-The AI model successfully identified a drug candidate, which moved into clinical trials much faster than traditional methods would allow. This approach reduced the time from target identification to clinical testing, showcasing the potential to accelerate drug development.	AI can significantly reduce the timeline and costs associated with drug discovery by quickly shifting through large datasets to identify promising candidates. - Leveraging AI in drug development can increase the speed and efficiency of finding new treatments for complex diseases.	[18,19]
AI in Virtual Health Assistants	**Mayo Clinic's Chatbot** for COVID-19 Screening: During the COVID-19 pandemic, Mayo Clinic implemented an AI-driven chatbot to screen patients for symptoms and provide guidance on testing and care options.	The chatbot was highly effective in reducing the burden on healthcare facilities by managing a large volume of patient inquiries. -It helped patients take care of patients effectively, ensuring those with severe symptoms received timely care while others received remote monitoring and support.	- AI-driven virtual health assistants can play a critical role in managing public health crises by providing timely and accurate information and reducing unnecessary visits to healthcare facilities. - They improve patient engagement and satisfaction by offering convenient and accessible support.	[20]
AI in Operational Efficiency	**DeepMind's AI** for Reducing Patient Deterioration: DeepMind, a subsidiary of Alphabet Inc., developed an AI system to predict acute kidney injury (AKI) in patients, helping to reduce the incidence of AKI.	- The AI system predicted AKI up to 48 hours before it was typically diagnosed by clinicians, enabling preventative measures that reduced the number of patients requiring dialysis or intensive care	- AI can improve operational efficiency by providing early warnings for patient deterioration, allowing healthcare providers to allocate resources more effectively and improve patient management. - Such applications highlight the potential for AI to reduce complications and improve overall patient safety.	[21]

Key Takeaways from Real-Life Implementations

1. **Improved Diagnostic Accuracy and Speed**: AI models such as CheXNeXt and DeepMind's AKI prediction tool have demonstrated the ability to diagnose conditions faster and with accuracy comparable to that of human experts. This not only enhances diagnostic precision but also facilitates earlier intervention, which is crucial for patient outcomes [5].

2. **Acceleration of Drug Discovery**: AI's capacity to process and analyze vast datasets at speeds unattainable by humans has proven valuable in identifying potential drug candidates more efficiently. The case of BenevolentAI's ALS treatment candidate exemplifies how AI can significantly shorten drug development timelines, potentially bringing effective treatments to market more quickly [18,19].

3. **Effective Patient Management and Engagement**: AI-driven virtual health assistants, such as the Mayo Clinic's COVID-19 chatbot, have effectively managed patient inquiries and triaged cases, reducing the burden on healthcare facilities and improving patient engagement through accessible and personalized interactions [20].

4. **Operational Efficiency and Predictive Analytics**: AI models are enhancing operational efficiency in hospitals by predicting patient deterioration and optimizing therapy, as demonstrated by HCA Healthcare's SPOT system and DeepMind's AKI prediction tool. These systems enable earlier interventions and better resource allocation, thereby reducing mortality rates and hospital stays [21].

Challenges of AI in Healthcare: While the use of AI in healthcare offers numerous benefits, it also presents challenges that must be addressed to ensure its effective and ethical implementation [22].

Table 1 : Representation of the challenges associated with AI in healthcare.

Challenge Area	Key Issues	Details	References
Data Privacy and Security	**Confidentiality** **Regulations**	Protecting sensitive patient data; vulnerability to breaches and misuse. Compliance with regulations like HIPAA (U.S.) and GDPR (Europe), adding complexity to data handling.	[23]
Data Quality and Integration	**Incomplete Data** **Data Integration**	AI models need high-quality comprehensive data; incomplete data can lead to inaccuracies. Challenges in integrating diverse data sources (e.g., EHRs, imaging systems) with varying formats.	[24]
Bias and Fairness	**Algorithmic Bias** **Equitable Access**	Potential perpetuation of biases leading to unequal treatment across demographic groups. Ensuring fair distribution of AI benefits to avoid exacerbating health disparities.	[25]
Regulatory and Ethical Issues	**Approval and Oversight** **Ethical Considerations**	Evolving regulatory landscape requires rigorous validation and oversight of AI applications. Issues like informed consent, patient autonomy, and potential misuse of AI technology.	[25,26]
Clinical Validation and Evidence	**Evidence-Based Practice** **Long-Term Impact**	Necessity for validation through clinical trials and real-world testing to ensure reliability. The need to evaluate the long-term effects of AI on patient outcomes and healthcare processes.	[26]

AI in Diagnosis

Artificial Intelligence (AI) is profoundly transforming the diagnostic landscape in healthcare, offering unprecedented precision, efficiency, and early detection capabilities [27]. The integration of AI into diagnostic processes involves leveraging advanced algorithms and machine learning techniques to analyze vast amounts of medical data, enabling more accurate and timely identification of diseases [28].

The primary areas where AI significantly impacts diagnostics include:

- Medical imaging
- Early disease detection through predictive analytics
- Genetic analysis for personalized medicine

Medical Imaging Applications

Medical imaging is one of the most prominent areas where AI has made a substantial impact. AI-powered tools and systems are being used to increase the accuracy, speed, and consistency of image analysis in radiology, pathology, and other imaging fields [29].

Radiology:

In radiology, AI algorithms are designed to assist in interpreting medical images such as X-rays, CT scans, MRI scans, and ultrasounds. For instance, AI systems can detect abnormalities in chest X-rays that may indicate conditions such as pneumonia, tuberculosis, and lung cancer [30].

Pathology:

In pathology, AI technologies are being employed to analyze tissue samples with unprecedented speed and accuracy, aiding in the detection of cancerous cells [31]. One notable development in this field is the Augmented Reality Microscope (ARM), which integrates AI directly into traditional optical microscopes to provide real-time feedback to pathologists during examinations. By overlaying AI-generated information onto the microscope's field of view, ARM highlights areas of concern, such as potential cancerous cells, enabling faster and more accurate diagnoses. This technology allows pathologists to focus on critical regions without relying entirely on fully digital systems, making it especially useful in resource-limited environments where advanced digital pathology infrastructure may not be available [32].

Studies have demonstrated ARM's effectiveness in diagnosing breast and colorectal cancers, with performance comparable to that of trained pathologists. Its ability to identify difficult-to-detect cancer cells in real time can significantly reduce diagnostic errors, enhance decision-making speed, and improve patient outcomes [33]. Additionally, by incorporating AI directly into the microscope, the system remains accessible to a broader range of healthcare settings, offering a low-cost yet highly effective diagnostic tool.

However, while the ARM shows great potential, its adoption presents challenges such as ensuring the AI model's robustness across diverse patient populations. Pathologists must also adapt to integrating AI into their workflows, requiring both training and standardization of AI-assisted tools. Despite these challenges, ARM represents a significant advancement in AI-driven pathology, improving both the accuracy and efficiency of cancer diagnosis [34].

Ophthalmology:

AI is making significant progress in ophthalmology, particularly in the early detection and diagnosis of retinal diseases such as diabetic retinopathy, macular degeneration, and glaucoma. By analyzing retinal scans with high precision, AI systems can detect these conditions earlier than traditional methods, enabling timely intervention and preventing vision loss [35]. AI algorithms, such as those developed by Google's DeepMind, have demonstrated the ability to diagnose eye conditions with accuracy comparable to that of human specialists, significantly improving patient outcomes through early diagnosis and treatment.

Beyond diagnosing retinal diseases, recent research has explored the use of AI algorithms to predict systemic diseases from retinal images. As discussed by Khan et al. (2023), AI systems are now capable of identifying signs of cardiovascular diseases, diabetes, and even kidney disease by analyzing subtle patterns in retinal scans. This cross-domain application of AI is transforming retinal imaging from a tool used solely for ophthalmic diagnoses to one that provides valuable insights into a patient's overall systemic health. Such predictive capabilities offer a non-invasive and efficient way to screen for systemic conditions, potentially leading to earlier interventions and improved disease management [36].

Early Disease Detection with Predictive Analytics

Predictive analytics is another domain where AI is rapidly evolving in healthcare diagnostics [37]. AI systems can analyze patient data such as electronic health records (EHRs), lifestyle information, and genetic data to predict the risk of certain illnesses. This capability enables early intervention and supports preventive care [38].

Cardiovascular Diseases:

AI algorithms are increasingly being used to predict cardiovascular events such as heart attacks and strokes [39]. For instance, the Framingham Heart Study has employed machine learning techniques to develop predictive models that assess the risk of cardiovascular diseases based on factors such as age, cholesterol levels, and blood pressure [40]. By identifying patterns and risk factors in large datasets that might be overlooked by traditional statistical methods, AI enables more accurate risk assessments and supports preventive care measures [41].

Diabetes:

In diabetes care, AI-driven predictive analytics can forecast the onset of type 2 diabetes by analyzing patient data, including glucose levels, family history, and lifestyle factors [42]. Early prediction enables timely lifestyle modifications and interventions that can delay or even prevent disease onset.

Cancer:

AI is also playing an important role in the early detection of cancer. Predictive analytics can identify individuals at high risk of developing cancers such as breast, colorectal, and prostate cancer [43]. By analyzing genetic markers, family history, and lifestyle factors, AI systems can recommend early screening and monitoring, leading to earlier detection and improved outcomes [44].

Moreover, AI is increasingly contributing to post-cancer care by providing personalized psychological support and cognitive rehabilitation to survivors. AI-driven platforms analyze patient data, including medical histories and psychological profiles, to offer tailored mental health interventions. These systems, often powered by virtual assistants and chatbots, guide patients through therapies such as cognitive behavioral therapy (CBT) and mindfulness exercises, offering continuous support. By addressing psychological challenges such as anxiety, depression, and cognitive decline, AI enhances the holistic recovery process and improves the quality of life for cancer survivors [45].

Genetic Analysis for Personalized Medicine

Genetic analysis is a rapidly advancing field in which AI plays a critical role. By analyzing genetic data, AI helps uncover the genetic foundations of diseases and supports the development of personalized treatment plans tailored to an individual’s genetic profile [46].

Genomic Sequencing:

AI algorithms are employed to analyze and interpret the vast amounts of data generated by genomic sequencing. Machine learning models can identify genetic mutations and variants associated with specific diseases [47]. This is particularly valuable in oncology, where identifying genetic mutations can inform targeted therapies.

Pharmacogenomics:

Pharmacogenomics, which examines how genes influence an individual’s response to medications, is another area where AI is making significant advancements. By analyzing genetic data, AI can predict how different patients will respond to medications, enabling personalized drug prescriptions that minimize adverse effects and maximize efficacy [48]. For example, the AI platform developed by Tempus analyzes both clinical and molecular data to provide insights into optimal treatment options for cancer patients based on their genetic profiles [49].

Rare Diseases:

AI is also being used to diagnose rare genetic disorders. By comparing a patient’s genetic data with extensive databases of known genetic conditions, AI can identify potential rare diseases that might be missed by traditional diagnostic approaches [50].

Table 2: Outlines how AI works in diagnosis across different applications.

Application	AI Mechanism	How AI Works	References
Medical Imaging	Deep Learning, Convolutional Neural Networks (CNNs)	AI analyses medical images, including X-rays, CT scans, and MRIs, to identify irregularities and diagnose diseases.	[29]
Pathology	Statistical Learning, Image Recognition	AI scans and interprets tissue samples to identify cancerous cells and other abnormalities. E.g.: Augmented Reality Microscope (ARM)	[31,32]
Ophthalmology	Neural Networks, Image Analysis	AI analyses retinal scans to detect eye diseases like diabetic retinopathy and macular degeneration.	[36]
Early Disease Detection	Predictive Analytics, Machine Learning Algorithms	AI predicts the likelihood of diseases by analysing patient data, including EHRs, lifestyle, and genetic information.	[37,38]
Genetic Analysis	Genomic Sequencing, Machine Learning	AI interprets genetic data to identify mutations and variants linked to diseases	[46]
Pharmacogenomics	Data Analytics, Machine Learning	AI predicts patient responses to medications based on genetic data, personalizing drug prescriptions.	[48,49]

AI in Treatment

Artificial Intelligence (AI) is revolutionizing healthcare by enabling more personalized, efficient, and effective medical interventions [51]. From creating customized treatment plans to accelerating drug discovery and enhancing surgical precision, AI is transforming how healthcare providers deliver care [52].

Personalized Treatment Plans Using Data Analysis:

Personalized treatment plans are a cornerstone of precision medicine, and AI is instrumental in tailoring these plans to individual patients' needs. By examining large volumes of data—including genetic information, lifestyle factors, and clinical history—AI can develop highly customized treatment strategies [53].

Integrating and Analysing Data:

AI algorithms aggregate information from multiple sources, such as electronic health records (EHRs) and genomic databases. Machine learning models analyze this data to uncover patterns and correlations that guide treatment decisions [54].

Predictive Modelling:

AI uses predictive modeling to forecast how patients will respond to different treatments. These models are trained on historical data, including treatment outcomes, side effects, and patient demographics [55]. By predicting the efficacy and potential adverse reactions of treatments, AI helps clinicians select the best therapeutic options for each patient. For instance, IBM Watson for Oncology employs machine learning to recommend personalized cancer treatment strategies tailored to a patient's genetic profile and current medical research [56].

Dynamic Treatment Adjustments:

AI enables real-time monitoring and adjustment of treatment plans. Wearable devices and remote monitoring tools collect continuous health data, which AI analyzes to detect changes in a patient's condition. This allows for dynamic treatment adjustments, ensuring that interventions remain effective over time [57].

Case Studies:

In cardiology, AI algorithms have been utilized to tailor treatments for patients with atrial fibrillation by predicting which antiarrhythmic drugs are most likely to prevent recurrence [58]. AI models, particularly those using machine learning algorithms like neural networks, process large datasets—including heart rhythm data, genetic markers, and clinical outcomes—to determine which patients should receive specific antiarrhythmic drugs such as amiodarone or flecainide [59].

In oncology, the **Tempus** platform integrates AI to process molecular profiles and clinical information, developing treatment strategies for cancer. Using support vector machines (SVMs) and deep learning models trained on large genomic datasets, patient data, and drug efficacy information, Tempus compares a patient's tumor molecular profile—including genetic mutations like *BRCA1/BRCA2*, *EGFR*, or *KRAS*—to recommend the most effective therapy [60].

AI-Driven Drug Discovery and Development:

Drug discovery and development are traditionally lengthy, costly, and have high failure rates. AI significantly accelerates this process by identifying potential drug candidates more efficiently and predicting their likelihood of success in clinical trials [61].

Identifying Drug Candidates:

AI algorithms screen vast chemical libraries to identify molecules with potential therapeutic effects. Machine learning models analyze chemical structures and predict their biological activity, dramatically reducing the time required to identify promising candidates [62]. For example, Atomwise uses AI to predict the binding affinity of small molecules to target proteins, streamlining the initial phase of drug discovery.

Predicting Drug Efficacy and Safety:

AI models predict the efficacy and safety of drug candidates by analyzing preclinical and clinical data. These models simulate how drugs interact with biological pathways and predict potential side effects [63]. This prioritizes the most promising candidates for clinical trials, improving overall success rates.

Optimizing Drug Design:

AI assists in optimizing chemical structures to enhance drug efficacy and reduce toxicity. By iteratively analyzing the relationship between a drug's structure and its biological activity, AI suggests modifications that improve performance [64].

AI in Patient Care

Artificial Intelligence is transforming patient care by enhancing engagement, facilitating remote monitoring, improving telemedicine, and enabling predictive analytics for better health management [65].

Virtual Health Assistants for Patient Engagement

Virtual health assistants (VHAs) are AI-driven platforms designed to interact with patients through digital channels such as chatbots, mobile apps, and voice assistants. They handle tasks ranging from answering health-related questions to reminding patients about medication schedules [66].

Personalized Patient Interaction :

VHAs tailor interactions based on medical history, preferences, and current health status [67]. For example, a VHA can remind a diabetic patient to check glucose levels, provide dietary advice, and suggest physical activities.

24/7 Availability:

Unlike human providers, VHAs offer continuous support, ensuring patients have access to information at all times, which reduces anxiety and improves satisfaction [68].

Health Education and Support:

Virtual Health Assistants (VHAs) can educate patients about their conditions and treatment plans. For instance, a VHA can explain the side effects of medications, offer tips for managing symptoms, and provide information on lifestyle changes that can improve health outcomes. This educational role is crucial in encouraging patients to take an active role in their treatment [69].

Reducing Administrative Burden:

By automating routine tasks such as appointment scheduling, prescription refills, and responses to common health questions, VHAs reduce the administrative burden on healthcare providers. This allows healthcare professionals to focus more on direct patient care and complex medical concerns [70].

Remote Monitoring and Telemedicine's Impact on Care

Remote monitoring and telemedicine have transformed patient care by enabling continuous health tracking and providing access to medical consultations without the need for in-person visits. AI enhances these technologies, making them more effective and user-friendly [71].

Continuous Health Monitoring:

AI-powered devices such as smartwatches and wearable sensors collect real-time data on vital signs and activity levels. AI algorithms analyze this data to detect anomalies, such as signs of atrial fibrillation, and alert healthcare providers [72].

Early Detection and Intervention:

AI continuously monitors health data to detect early indicators of disease or exacerbations of chronic illnesses, allowing for timely interventions. For example, AI can predict asthma attacks by tracking environmental factors and patient symptoms [73].

Telemedicine Integration:

AI supports telemedicine by offering diagnostic insights and decision-making tools during virtual consultations, enhancing the accuracy and efficiency of care [74].

Patient Convenience and Access:

Remote monitoring and telemedicine reduce the need for in-person visits, improving access to healthcare, particularly for patients in rural or underserved regions [75].

Reducing Healthcare Costs: By enabling early detection and reducing hospital admissions, these technologies lower healthcare costs and support more cost-effective care through virtual consultations [76].

Predictive Analytics for Managing Patient Care

Predictive analytics leverages AI to analyze historical and real-time data to forecast future health events, enabling proactive and preventive care management. This approach is transforming how healthcare providers manage patient care [77].

Risk Stratification:

AI-driven predictive models can categorize patients according to their risk of developing specific conditions or experiencing adverse health events [78].

Personalized Care Plans:

By forecasting how patients may respond to different treatments, AI helps healthcare providers develop personalized care plans that account for individual risk factors, genetic profiles, and lifestyle habits. For example, AI can predict which patients are most likely to benefit from specific medications based on their genetic makeup and clinical history [79].

Chronic Disease Management:

Predictive analytics is particularly valuable for managing chronic diseases. AI models can forecast disease progression and suggest interventions to prevent complications. For example, predictive analytics can predict blood glucose levels in diabetic patients, enabling personalized insulin therapy and dietary recommendations [80].

Improving Patient Outcomes:

Predictive analytics supports early intervention and personalized care, leading to improved disease management and enhanced quality of life [81].

Operational Efficiency:

Predictive analytics helps healthcare providers optimize resource allocation by forecasting patient admission rates and adjusting staffing levels to meet demand [82].

Table 3: Outlines how AI works in patient care.

Heading	Description	Examples
Virtual Health Assistants for Patient Engagement	**Personalized Patient Interaction:** Tailors interactions based on individual patient data (medical history, preferences, current health status) [67]. **24/7 Availability:** Provides immediate responses to patient inquiries anytime [68]. **Health Education and Support:** Educates patients about conditions, treatment plans, and lifestyle changes [69]. **Reducing Administrative Burden:** Automates routine tasks like appointment scheduling and prescription refills [70].	Ada Health: Guides patients through a set of questions regarding their symptoms to offer potential causes and next steps. Buoy Health: Diagnoses patients based on symptoms and suggests appropriate actions
Remote Monitoring and Telemedicine's Impact on Care	**Continuous Health Monitoring:** AI-powered devices gather real-time information on vital signs and health metrics [72]. **Early Detection and Intervention:** Identifies early signs of diseases or chronic condition exacerbations for timely intervention [73]. **Telemedicine Integration:** Provides diagnostic support and decision-making tools during virtual consultations [74]. **Patient Convenience and Access:** Decreases the necessity for in-person visits, improving access to healthcare [75,76]. **Reducing Healthcare Costs:** Lowers costs by enabling early detection and	Livongo: Provides personalized insights and recommendations for managing chronic conditions. Amwell: Integrates AI to assist doctors during virtual visits.

Heading	Description	Examples
	reducing hospital admissions [77].	
Predictive Analytics for Managing Patient Care	**Risk Stratification:** Identifies patients who are at high risk of developing conditions or encountering adverse events [78]. **Personalized Care Plans:** Predicts patient responses to treatments for personalized care plans [79]. **Chronic Disease Management:** Forecasts disease progression and suggests interventions [80]. **Improving Patient Outcomes:** Enables early intervention and personalized care for better outcomes [81]. **Operational Efficiency:** Optimizes resource allocation and operational efficiency [82].	Sepsis Watch: Identifies patients at risk of sepsis for early intervention. Cleveland. Clinic's Predictive Model: Identifies patients at high risk of cardiac arrest for preventive measures.

Future Prospects and Innovations

The future of AI in healthcare appears highly promising, with numerous emerging technologies and trends expected to further transform the field. Equally important is the education and training of healthcare professionals, ensuring they are well-equipped to effectively utilize and integrate these advanced technologies into patient care [83].

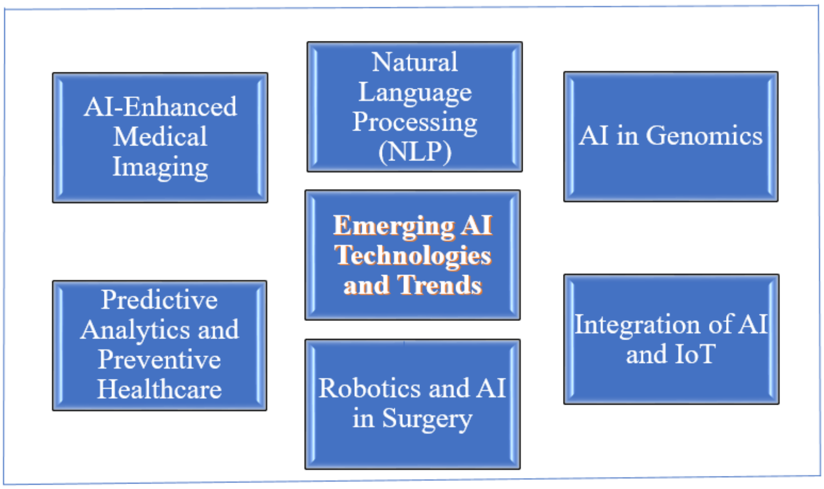

Figure 1. Emerging AI Technologies and Trends.

1. AI-Enhanced Medical Imaging:

AI algorithms are becoming increasingly sophisticated in analyzing medical images. Future advancements will likely enable AI not only to identify abnormalities in X-rays, MRIs, and CT scans but also to provide comprehensive diagnostic insights and even suggest treatment options [84]. For instance, AI could detect early indicators of diseases such as cancer—potentially before they are noticeable by human radiologists—allowing for earlier and more effective interventions.

2. Natural Language Processing (NLP):

NLP technologies are advancing rapidly, enabling AI systems to better understand and interact with human language. This has significant implications for patient care, including more accurate transcription of medical records, extraction of actionable insights from clinical notes, and even direct patient interaction through chatbots [85]. Enhanced NLP capabilities could streamline documentation processes, improve data accuracy, and support more efficient patient data management.

3. AI in Genomics:

The integration of AI with genomics represents another promising trend. AI can process vast amounts of genetic data to uncover patterns and correlations that would be challenging for humans to detect [86]. This enables the development of personalized medicine, where treatments are customized according to an individual's genetic profile. AI-driven genomics can identify genetic predispositions to diseases and help develop targeted therapies.

4. Predictive Analytics and Preventive Healthcare:

Predictive analytics powered by AI is poised for significant growth, enabling healthcare providers to foresee and prevent health issues before they become critical [87]. By analyzing data from multiple sources—including wearable devices, electronic health records, and lifestyle information—AI can predict disease likelihood and recommend preventive measures [88]. This shift toward preventive healthcare can improve patient outcomes while reducing healthcare costs.

5. Robotics and AI in Surgery:

Robotic surgery enhanced by AI will continue to evolve, making procedures less invasive and more precise [89]. AI can assist in preoperative planning, provide real-time decision support during surgery, and optimize postoperative recovery management. As this technology advances, it is expected to expand to a wider range of surgical specialties, improving patient recovery times and reducing complications.

6. Integration of AI and IoT:

Integrating AI with the Internet of Things (IoT) is creating smarter healthcare ecosystems. Connected devices continuously monitor patients' health and transmit real-time data to AI systems, which analyze the information to generate insights and alerts [90]. This integration enables proactive remote patient monitoring and chronic disease management, leading to more personalized and responsive healthcare delivery.

CONCLUSION

The application of artificial intelligence in healthcare offers a promising pathway to improve the quality, efficiency, and effectiveness of medical services. AI facilitates early diagnosis, supports a range of treatment options, enhances patient outcomes, and optimizes healthcare operations. However, critical challenges—including data privacy, algorithmic bias, and equitable access to AI technologies—must be addressed. AI systems must comply with regulatory requirements such as HIPAA and GDPR to safeguard patient data while also preventing algorithmic biases to ensure equitable healthcare delivery across all populations.

Future development of AI in healthcare should focus on continuous research, ethical oversight, and real-world validation to maximize its positive impact. Equally important is the training of healthcare professionals to effectively integrate AI into clinical workflows. By addressing these core areas, the healthcare sector can fully leverage AI to deliver more personalized, efficient, and equitable care.

REFERENCES

1. Patil S, Shankar H. Transforming healthcare: harnessing the power of AI in the modern era. *International Journal of Multidisciplinary Sciences and Arts*. 2023 Jul 10;2(1):60-70.
2. Chen Z, Liang N, Zhang H, Li H, Yang Y, Zong X, Chen Y, Wang Y, Shi N. Harnessing the power of clinical decision support systems: challenges and opportunities. *Open Heart*. 2023 Nov 1;10(2):e002432.
3. Husnain A, Rasool S, Saeed A, Gill AY, Hussain HK. AI'S healing touch: examining machine learning's transformative effects on healthcare. *Journal of World Science*. 2023 Oct 30;2(10):1681-95.
4. Sufyan M, Shokat Z, Ashfaq UA. Artificial intelligence in cancer diagnosis and therapy: Current status and future perspective. *Computers in Biology and Medicine*. 2023 Aug 14:107356.
5. Allami RH, Yousif MG. Integrative AI-driven strategies for advancing precision medicine in infectious diseases and beyond: a novel multidisciplinary approach. arXiv preprint arXiv:2307.15228. 2023 Jul 27.
6. Sahu M, Gupta R, Ambasta RK, Kumar P. Artificial intelligence and machine learning in precision medicine: A paradigm shift in big data analysis. *Progress in molecular biology and translational science*. 2022 Jan 1;190(1):57-100.
7. Mak KK, Wong YH, Pichika MR. Artificial intelligence in drug discovery and development. *Drug Discovery and Evaluation: Safety and Pharmacokinetic Assays*. 2023 Sep 28:1-38.
8. Kuziemsky C, Maeder AJ, John O, Gogia SB, Basu A, Meher S, Ito M. Role of artificial intelligence within the telehealth domain. *Yearbook of medical informatics*. 2019 Aug;28(01):035-40.
9. HENEL WIND JK. *AI-Powered Virtual Health Assistants: Transforming Patient Engagement Through Virtual Nursing*.
10. Prabhod KJ. The Role of Artificial Intelligence in Reducing Healthcare Costs and Improving Operational Efficiency. *Quarterly Journal of Emerging Technologies and Innovations*. 2024 Apr 16;9(2):47-59.
11. Sarker M. Assessing the Integration of AI Technologies in Enhancing Patient Care Delivery in US Hospitals. *Journal of Knowledge Learning and Science Technology*. 2023;2(2):338-51.
12. Zahra MA, Al-Taher A, Alquhaidan M, Hussain T, Ismail I, Raya I, Kandeel M. The synergy of artificial intelligence and personalized medicine for the enhanced diagnosis, treatment, and prevention of disease. *Drug Metabolism and Personalized Therapy*. 2024 Jul 15.
13. Qayyum MU, Sherani AM, Khan M, Hussain HK. Revolutionizing Healthcare: The Transformative Impact of Artificial Intelligence in Medicine. *BIN: Bulletin Of Informatics*. 2023;1(2):71-83.
14. Williamson SM, Prybutok V. Balancing privacy and progress: a review of privacy challenges, systemic oversight, and patient perceptions in AI-driven healthcare. *Applied Sciences*. 2024 Jan 12;14(2):675.
15. Ueda D, Kakinuma T, Fujita S, Kamagata K, Fushimi Y, Ito R, Matsui Y, Nozaki T, Nakaura T, Fujima N, Tatsugami F. Fairness of artificial intelligence in healthcare: review and recommendations. *Japanese Journal of Radiology*. 2024 Jan;42(1):3-15.
16. Esmaeilzadeh P. Challenges and strategies for wide-scale artificial intelligence (AI) deployment in healthcare practices: A perspective for healthcare organizations. *Artificial Intelligence in Medicine*. 2024 May 1;151:102861.
17. Nadella GS, Satish S, Meduri K, Meduri SS. A Systematic Literature Review of Advancements, Challenges and Future Directions of AI And ML in Healthcare. *International Journal of Machine Learning for Sustainable Development*. 2023 Sep 8;5(3):115-30.

18. Hlávka JP. Security, privacy, and information-sharing aspects of healthcare artificial intelligence. In *Artificial intelligence in healthcare*. 2020 Jan 1 (pp. 235-270). Academic Press.
19. Esmaeilzadeh P. Challenges and strategies for wide-scale artificial intelligence (AI) deployment in healthcare practices: A perspective for healthcare organizations. *Artificial Intelligence in Medicine*. 2024 May 1;151:102861.
20. Ferrara E. Fairness and bias in artificial intelligence: A brief survey of sources, impacts, and mitigation strategies. *Sci.* 2023 Dec 26;6(1):3.
21. Gomis-Pastor M, Berdún J, Borrás-Santos A, De Dios López A, Fernández-Montells Rama B, García-Esquirol Ó, Gratacòs M, Ontiveros Rodríguez GD, Pelegrín Cruz R, Real J, Bachs i Ferrer J. Clinical Validation of Digital Healthcare Solutions: State of the Art, Challenges and Opportunities. In *Healthcare.* 2024 May 22 (Vol. 12, No. 11, p. 1057). MDPI.
22. Gouripur K. The Impact of Artificial Intelligence on Healthcare: A Revolution in Progress. *The North and West London Journal of General Practice*. 2024 Feb 14;10(1).
23. Pillai AS. Utilizing Deep Learning in Medical Image Analysis for Enhanced Diagnostic Accuracy and Patient Care: Challenges, Opportunities, and Ethical Implications. *Journal of Deep Learning in Genomic Data Analysis*. 2021 May 11;1(1):1-7.
24. Oyeniyi J, Oluwaseyi P. Emerging Trends in AI-Powered Medical Imaging: Enhancing Diagnostic Accuracy and Treatment Decisions.
25. McKinney S.M., Sieniek M., Godbole V., et al. International evaluation of an AI system for breast cancer screening. *Nature.* 2020; 577(7788):89-94.
26. Goswami N.G., Sampathila N., Bairy G.M., Chadaga K., Goswami A. and Belurkar S. Digital pathology in healthcare: current trends and future perspective. *Int. J. Online Biomed. Eng.* 2024; 20(9).
27. De Fauw J., Schmidt M.H., Franke R., et al. Clinically applicable deep learning for diagnosis and referral in retinal disease. *Nat. Med.* 2018; 24(9):1342-1350.
28. Ahmed Z., Mohamed K., Zeeshan S. and Dong X. Artificial intelligence with multi-functional machine learning platform development for better healthcare and precision medicine. *Database.* 2020; 2020:baaa010.
29. Khalifa M. and Albadawy M. Artificial intelligence for clinical prediction: exploring key domains and essential functions. *Comput. Methods Programs Biomed. Update*. 2024; 100148.
30. Krittanawong C., Zhang H., Wang Z., Aydar M. and Kitai T. Artificial intelligence in precision cardiovascular medicine. *J. Am. Coll. Cardiol.* 2017; 69(21):2657-2664.
31. Rajliwall N.S., Davey R. and Chetty G. Machine learning based models for cardiovascular risk prediction. *Proc. Int. Conf. Mach. Learn. Data Eng.* 2018; 142-148.
32. Edunjobi T.E. and Odejide O.A. Theoretical frameworks in AI for credit risk assessment: towards banking efficiency and accuracy. *Int. J. Sci. Res. Updates.* 2024; 7(01):92-102.
33. Jamil K., Fatima M.A. and Al Saiqali M. Exciting advancements in artificial intelligence and machine learning for type 2 diabetes.
34. Hunter B., Hindocha S. and Lee R.W. The role of artificial intelligence in early cancer diagnosis. *Cancers* 2022; 14(6):1524.
35. Kenner B., Chari S.T., Kelsen D., Klimstra D.S., Pandol S.J., Rosenthal M., Rustgi A.K., Taylor J.A., Yala A., Abul-Husn N. and Andersen D.K. Artificial intelligence and early detection of pancreatic cancer: 2020 summative review. *Pancreas.* 2021; 50(3):251-279.
36. Kann B.H., Hosny A. and Aerts H.J. Artificial intelligence for clinical oncology. *Cancer Cell.* 2021; 39(7):916-927.
37. Sofi P.A., Zargar S.M., Hamadani A., Shafi S., Zaffar A., Riyaz I., Bijarniya D. and Prasad P.V. Decoding life: genetics, bioinformatics, and artificial intelligence. In: *A Biologist's Guide to Artificial Intelligence*. 2024; 47-66. Academic Press.

38. Aradhya S., Facio F.M., Metz H., Manders T., Colavin A., Kobayashi Y., Nykamp K., Johnson B. and Nussbaum R.L. Applications of artificial intelligence in clinical laboratory genomics. *Am. J. Med. Genet. Part C: Semin. Med. Genet.* 2023; 193(3):e32057.
39. Patrinos G.P., Sarhangi N., Sarrami B., Khodayari N., Larijani B. and Hasanzad M. Using ChatGPT to predict the future of personalized medicine. *Pharmacogenomics J.* 2023; 23(6):178-184.
40. Sebastian A.M. and Peter D. Artificial intelligence in cancer research: trends, challenges and future directions. *Life* 2022; 12(12):1991.
41. Kováč P., Jackuliak P., Bražinová A., Varga I., Aláč M., Smatana M., Lovich D. and Thurzo A. Artificial intelligence-driven facial image analysis for the early detection of rare diseases: legal, ethical, forensic, and cybersecurity considerations. *AI.* 2024; 5(3):990-1010.
42. Singh A.P., Saxena R., Saxena S. and Maurya N.K. Artificial intelligence revolution in healthcare: transforming diagnosis, treatment, and patient care. *Asian J. Adv. Res.* 2024; 7(1):241-263.
43. Gouripur K. The impact of artificial intelligence on healthcare: a revolution in progress. *North West London J. Gen. Pract.* 2024; 10(1).
44. Mulukuntla S. and Venkata S.P. AI-driven personalized medicine: assessing the impact of federal policies on advancing patient-centric care. *EPH-Int. J. Med. Health Sci.* 2020; 6(2):20-26.
45. Dykstra S. Integrating multi-domain electronic health data, machine learning, and automated cardiac phenomics for personalized cardiovascular care.
46. Noorbakhsh-Sabet N., Zand R., Zhang Y. and Abedi V. Artificial intelligence transforms the future of health care. *Am. J. Med.* 2019; 132(7):795-801.
47. Johnson K.B., Wei W.Q., Weeraratne D., Frisse M.E., Misulis K., Rhee K., Zhao J. and Snowdon J.L. Precision medicine, AI, and the future of personalized health care. *Clin. Transl. Sci.* 2021; 14(1):86-93.
48. Dogheim G.M. and Hussain A. Patient care through AI-driven remote monitoring: analyzing the role of predictive models and intelligent alerts in preventive medicine. *J. Contemp. Healthc. Anal.* 2023; 7(1):94-110.
49. Martínez-Sellés M. and Marina-Breysse M. Current and future use of artificial intelligence in electrocardiography. *J. Cardiovasc. Dev. Dis.* 2023; 10(4):175.
50. Sebastian A.M. and Peter D. Artificial intelligence in cancer research: trends, challenges and future directions. *Life.* 2022; 12(12):1991.
51. Patel V. and Shah M. Artificial intelligence and machine learning in drug discovery and development. *Intell. Med.* 2022; 2(3):134-140.
52. Han R., Yoon H., Kim G., Lee H. and Lee Y. Revolutionizing medicinal chemistry: the application of artificial intelligence (AI) in early drug discovery. *Pharmaceuticals.* 2023; 16(9):1259.
53. Mak K.K., Wong Y.H. and Pichika M.R. Artificial intelligence in drug discovery and development. *Drug Discov. Eval. Safety Pharmacokinetic Assays* 2023; 1-38.
54. Mackie J. and Graepel T. AI-driven healthcare transformation: enhancing clinical outcomes through personalized care and remote patient monitoring.
55. Shaid T. and Graepel T. Harnessing the power of AI in healthcare: remote patient monitoring, telemedicine, and predictive analytics for improved clinical outcomes.
56. Magni D. Revolutionizing healthcare: unveiling the transformative power of chatbots through a systematic literature review. *Des. Dev. Emerg. Chatbot Technol.* 2024; 199-217.
57. Van der Eijk M., Faber M.J., Aarts J.W., Kremer J.A., Munneke M. and Bloem B.R. Using online health communities to deliver patient-centered care to people with chronic conditions. *J. Med. Internet Res.* 2013; 15(6):e115.
58. Zeadally S. and Bello O. Harnessing the power of internet of things-based connectivity to improve healthcare. *Internet Things.* 2021; 14:100074.

59. Ingale M.S. AI-powered healthcare chatbots: designing intelligent virtual assistants for patient education, symptom triage, and remote monitoring in telemedicine services.
60. Kelley L.T., Phung M., Stamenova V., Fujioka J., Agarwal P., Onabajo N., Wong I., Nguyen M., Bhatia R.S. and Bhattacharyya O. Exploring how virtual primary care visits affect patient burden of treatment. *Int. J. Med. Inform.* 2020; 141:104228.
61. Marquis Y., Oladoyinbo T.O., Olabanji S.O., Olaniyi O.O. and Ajayi S.A. Proliferation of AI tools: a multifaceted evaluation of user perceptions and emerging trend. *Asian J. Adv. Res. Rep.* 2024; 18(1):30-55.
62. Junaid S.B., Imam A.A., Shuaibu A.N., Basri S., Kumar G., Surakat Y.A., Balogun A.O., Abdulkarim M., Garba A., Sahalu Y. and Mohammed A. Artificial intelligence, sensors and vital health signs: a review. *Appl. Sci.* 2022; 12(22):11475.
63. Farid F., Bello A., Ahamed F. and Hossain F. The roles of AI technologies in reducing hospital readmission for chronic diseases: a comprehensive analysis.
64. Kuziemsky C., Maeder A.J., John O., Gogia S.B., Basu A., Meher S. and Ito M. Role of artificial intelligence within the telehealth domain. *Yearb. Med. Inform.* 2019; 28(1):35-40.
65. Tolu-Akinnawo O., Ezekwueme F. and Awoyemi T. Telemedicine in cardiology: enhancing access to care and improving patient outcomes. *Cureus.* 2024; 16(6).
66. Singh P. and Tiwari S. Machine learning models for cost-effective healthcare delivery systems. In: *Digital Transformation in Healthcare 5.0: Volume 1: IoT, AI and Digital Twin.* 2024; 245.
67. Nwaimo C.S., Adegbola A.E. and Adegbola M.D. Transforming healthcare with data analytics: predictive models for patient outcomes. *GSC Biol. Pharm. Sci.* 2024; 27(3):25-35.
68. Mohsin S.N., Gapizov A., Ekhator C., Ain N.U., Ahmad S., Khan M., Barker C., Hussain M., Malineni J., Ramadhan A. and Nagaraj R.H. The role of artificial intelligence in prediction, risk stratification, and personalized treatment planning for congenital heart diseases. *Cureus.* 2023; 15(8).
69. Johnson K.B., Wei W.Q., Weeraratne D., Frisse M.E., Misulis K., Rhee K., Zhao J. and Snowdon J.L. Precision medicine, AI, and the future of personalized health care. *Clin. Transl. Sci.* 2021; 14(1):86-93.
70. Badidi E. Edge AI for early detection of chronic diseases and the spread of infectious diseases: opportunities, challenges, and future directions. *Future Internet.* 2023; 15(11):370.
71. Ahmed Z., Mohamed K., Zeeshan S. and Dong X. Artificial intelligence with multi-functional machine learning platform development for better healthcare and precision medicine. *Database.* 2020; 2020:baaa010.
72. Thethi S.K. Machine learning models for cost-effective healthcare delivery systems: a global perspective. In: *Digital Transformation in Healthcare 5.0: Volume 1: IoT, AI and Digital Twin.* 2024; 199.
73. Qadri Y.A., Nauman A., Zikria Y.B., Vasilakos A.V. and Kim S.W. The future of healthcare internet of things: a survey of emerging technologies. *IEEE Commun. Surv. Tutorials.* 2020; 22(2):1121-1167.
74. Siddiq M. ML-based medical image analysis for anomaly detection in CT scans, X-rays, and MRIs. *Devotion: J. Res. Community Serv.* 2020; 2(1):53-64.
75. Hisan U.K., Chaaben A.B., Adeleye A.O. and Kaushik A. Impact of natural language processing on healthcare quality: a review of clinical and public health applications. *J. Adv. Anal. Healthc. Manag.* 2022; 6(1):19-42.
76. Jyothi N.M. AI-enabled genomic biomarkers: the future of pharmaceutical industry and personalized medicine.
77. Telo J. AI for enhanced healthcare security: an investigation of anomaly detection, predictive analytics, access control, threat intelligence, and incident response. *J. Adv. Anal. Healthc. Manag.* 2017; 1(1):21-37.

78. Dogheim G.M. and Hussain A. Patient care through AI-driven remote monitoring: analyzing the role of predictive models and intelligent alerts in preventive medicine. *J. Contemp. Healthc. Anal.* 2023; 7(1):94-110.
79. Johansson B., Eriksson E., Berglund N. and Lindgren I. Robotic surgery: review on minimally invasive techniques. *Fusion Multidiscip. Res. Int. J.* 2021; 2(2):201-210.
80. Thakare V., Khire G. and Kumbhar M. Artificial intelligence (AI) and internet of things (IoT) in healthcare: opportunities and challenges. *ECS Trans.* 2022; 107(1):7941.
81. Abdelhadi N.N., Dabbous A. and Jaddoua S.M. Role of clinical pharmacy services in vitamin supplementation in critically ill cancer patients: a 3-year retrospective study at a comprehensive cancer centre. *Jordan J. Pharm. Sci.* 2025; 18(2):332-340.
82. Alfalahi A.N., Matalqah S.M., Issa R., Al-Daghistani H.I. and Abed A. Evaluation of cytotoxicity and antibacterial activity of green synthesized silver nanoparticles using *Hedera helix* extract. *Jordan J. Pharm. Sci.* 2025; 18(2):524-537.
83. Abu Dayyih W., Hailat M., Albtoush S., Albtoush E., Abu Dayah A., Alabbadi I. and Hamad M.F. Nanomedicine advancements in cancer therapy: a scientific review. *Jordan J. Pharm. Sci.* 2024; 17(3):506-529.
84. Alwidyan T., Abudalo R., Odeh M., Tayyem M. and Banat A. Community pharmacists' attitudes toward the implementation of good pharmacy practice guidelines in Jordan: a cross-sectional survey. *Jordan J. Pharm. Sci.* 2025; 18(2):389-409.
85. Yusuf I. and Ibrahim R. The predictive value of neutrophil/lymphocyte ratio for CK-MB elevation in myocardial infarction: a study in Syrian ACS patients. *Jordan J. Pharm. Sci.* 2025; 18(2):586-595.
86. Jyothi N.M. AI-enabled genomic biomarkers: the future of pharmaceutical industry and personalized medicine.
87. Telo J. AI for enhanced healthcare security: an investigation of anomaly detection, predictive analytics, access control, threat intelligence, and incident response. *J. Adv. Anal. Healthc. Manag.* 2017; 1(1):21-37.
88. Dogheim G.M. and Hussain A. Patient care through AI-driven remote monitoring: analyzing the role of predictive models and intelligent alerts in preventive medicine. *J. Contemp. Healthc. Anal.* 2023; 7(1):94-110.
89. Johansson B., Eriksson E., Berglund N. and Lindgren I. Robotic surgery: review on minimally invasive techniques. *Fusion Multidiscip. Res. Int. J.* 2021; 2(2):201-210.
90. Thakare V., Khire G. and Kumbhar M. Artificial intelligence (AI) and internet of things (IoT) in healthcare: opportunities and challenges. *ECS Trans.* 2022; 107(1):7941.

لمسة الذكاء الاصطناعي العلاجية: تحويل الرعاية الصحية من التشخيص إلى التعافي. مراجعة شاملة لتطبيقات الذكاء الاصطناعي في أنظمة الرعاية الصحية الحديثة

س. سوجانيا [1]، شيخ شاكر باشا [1]* ، م. ساينات ياداف [1]

[1] قسم التحليل الصيدلاني، معهد راغافيندرا للتعليم والبحث الصيدلاني، تقاطع كيه. آر. بالي، تشيييدو، أنانتابورامو–515721 (ولاية أندرا براديش).

ملخص

يتزايد اعتماد الذكاء الاصطناعي في مجال الرعاية الصحية، وقد بدأ يُحدث تأثيرًا ملموسًا على جوانب مُختلفة من هذا القطاع، بدءًا من التشخيص واستراتيجيات العلاج وصولًا إلى رعاية المرضى. نناقش هذه التطبيقات في هذه المراجعة باستخدام الذكاء الاصطناعي، بما في ذلك التحليلات التنبؤية وتقنيات التعلم الآلي، بالإضافة إلى الطب عن بُعد والمراقبة عن بُعد المُعتمدة على الذكاء الاصطناعي. تُوفر هذه التطورات فوائد كبيرة لرعاية المرضى، وتُحسّن الكفاءة التشغيلية، وتُخفّض التكاليف. إلا أن هناك تحديات حقيقية في مجالات مثل خصوصية البيانات، والتحيز الخوارزمي، والامتثال. تُضيف هذه المراجعة إلى الدراسات السابقة أن مُختصي الرعاية الصحية بحاجة إلى التدريب قبل أن يتمكنوا من الاستفادة المثلى من تقنيات الذكاء الاصطناعي. كلما زادت تعقيداتها، زاد تأثيرها على الرعاية الصحية، مُحسّنةً رعاية المرضى بطريقة تُناسب مرضانا على حدة، دون النظر إلى كل مرض من منظور خارجي وداخلي فقط.

الكلمات الدالة: الذكاء الاصطناعي، التحليلات التنبؤية، التعلم الآلي، الطب عن بعد، رعاية المرضى، التحيز الخوارزمي.

* ***المؤلف المراسل: شيخ شاكر باشا***

shakirbasha72@gmail.com

تاريخ استلام البحث 2024/08/07 وتاريخ قبوله للنشر 2024/09/21.