

Re-Imagining Chronic Care: Artificial Intelligence Facilitated Collaborative Decision Making for Diabetes and Hypertension

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ABSTRACT

Background: Diabetes and hypertension are chronic diseases that pose serious healthcare challenges because of their chronic nature and ongoing need for care. Chronic care has traditionally been non-personalized and not supported by real-time decision making. Artificial intelligence (AI) presents new possibilities by allowing collaborative decision-making, enhanced predictive accuracy, and patient engagement.

Objective: This investigation seeks to reimagine chronic care through assessing the role that collaborative decision-making facilitated by AI may play in diabetes and hypertension management, highlighting patient outcome improvement, complication prevention, and the support of healthcare workers in resource-scarce environments.

Methods: This study is grounded on secondary sources of data, such as peer-reviewed journals, systematic reviews, and evidence from international models of healthcare. The research critically assesses current literature on AI use in the management of chronic diseases, and synthesizes evidence on its efficacy for clinical decision-making, risk assessment, and patient tracking. Principal challenges like ethical implications, data privacy, integration into workflow, and digital equity are also discussed.

Results: Findings indicate that decision-making facilitated through AI has a profound impact on clinical efficiency as it facilitates timely intervention, and tailored treatment approaches. Evidence supports the contention that AI contributes to enhanced patient engagement by facilitating real-time monitoring tools and predictive analytics, especially in glycemic control and blood pressure management. Barriers to these advancements include insufficient algorithmic transparency, limited infrastructure, and inequities in access, among others.

Conclusion: AI can revolutionize management of chronic care by enabling greater cooperation between patients and healthcare professionals. Although there is evidence that it benefits satisfaction, compliance, and outcomes, effective implementation will involve overcoming ethical, technical, and equity challenges. Future efforts should involve incorporating AI into regular care models with adequate transparency, accountability, and inclusiveness.

KEYWORDS: Artificial intelligence, Diabetes mellitus, Chronic disease management, Healthcare technology, Remote patient monitoring.

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INTRODUCTION

Chronic non-communicable diseases, especially diabetes and hypertension, remain enormous challenges to public health internationally. The International Diabetes Federation states that the number of people living with diabetes is more than 500 million adults globally, and hypertension is a key driver for cardiovascular morbidity and mortality.^{1,2} Despite the existence of well-established clinical guidelines, a lot of patients suffer from suboptimal control of their diseases because of fragmented care pathways, poor compliance with treatment, and inadequate patient activation.³

This review critically reviews the existing evidence pertaining to AI-supported collaborative decision-making tools for managing diabetes and hypertension specifically. The review synthesises the findings concerning clinical effectiveness, usability of the system, and implementation challenges and suggests areas for future research.

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METHODOLOGY

A narrative review of literature was performed utilising the Scopus, PubMed, and CINAHL databases. All studies between 2018, and 2025 were included. The main search terms were: "artificial intelligence," "clinical decision support," "collaborative decision making," "diabetes," and "hypertension." The studies included those that emphasised the utilisation of AI to facilitate shared decision making between patients and healthcare professionals in managing these chronic diseases.

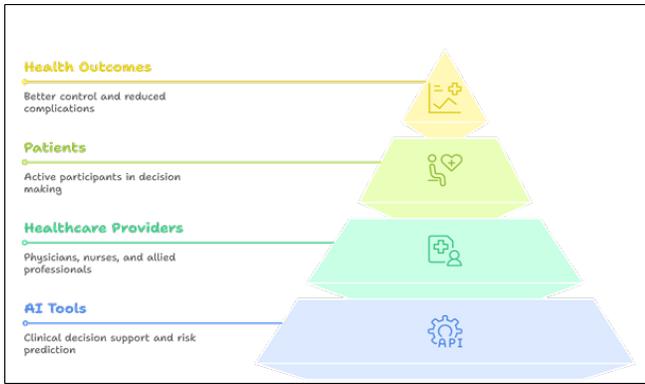


Figure 1: AI-facilitated healthcare collaboration. At the base, AI tools provide clinical decision support and risk prediction. Healthcare providers, including physicians, nurses, and allied professionals, apply these insights in clinical practice. Patients act as active participants in decision-making, supported by personalized information. At the top, improved health outcomes are achieved through better control and reduced complications.

Articles were not included, if they reported original clinical trials, cohort studies, or case-control studies on original patient data collection. Exclusion was also made from studies that dealt only with algorithm development and not with clinical use. Shortlisting occurred in 36 studies after abstract screening, and 20 studies were ultimately selected for final review based on completeness and relevance.

RESULTS

AI-Based Clinical Decision Support for Diabetes Management

Several studies establish that AI-based CDSS have the potential to optimize type-2 diabetes mellitus patients' glycemic control to a significant degree. According to one review article, AI-based interventions achieved an average decrease of approximately, 0.9% in glycated hemoglobin (HbA1c) compared with standard care.⁴ AI-based valuable models are for decision support systems in proposing insulin adjustment, diet, and pharmacological intervention according to individualised patient profiles.⁵

Apart from this, AI software with clinician input has also been shown to enhance drug prescribing accuracy and compliance with clinical guidelines.⁶ In spite of such developments, the interpretability of AI recommendations and automation bias are concerns.⁷

Role of AI in Hypertension Management

In antihypertensive treatment, AI-driven CDSS augmented evidence-based guidelines following and supported the timely adjustment of therapy in hypertension management.⁸ AI-driven electronic alerting and risk prediction profiles have been associated with a reduction in systolic blood pressure of 6 to 10 mmHg across different clinical settings.⁹

One study on AI-supported remote patient monitoring demonstrated improved blood pressure control with the incorporation of clinician feedback and patient education.¹⁰ Such evidence supports that AI can supplement patient and clinician self-management decision-making for the management of hypertension.

Conversational AI for Patient Self-Management

Conversational AI-driven platforms such as the Lark Diabetes Prevention Program have been found to be effective for improving patient self-management. Observational data have demonstrated that these platforms can have up to 1.1 percentage point reductions in HbA1c and sustainable weight loss at 12-months.^{11,12} These platforms provide continuous coaching, personalised feedback, and real-time behavioral interventions, resulting in higher patient engagement and adherence to lifestyle modification.

Communication and Shared Decision Making

Both improved clinician–patient communication and technology enable effective shared decision making. AI modules within telemedicine platforms and secure message systems have made shared decision-making more efficient, improving patient compliance and satisfaction.¹³

However, qualitative findings show that success in the implementation of these tools also depends on the explainability of AI recommendations and the level of patient-clinician trust.¹⁴ Clinicians will not adopt AI-based recommendations without explainable results, and patients will not endorse AI-based judgments.

DISCUSSION

Implementation of AI in managing chronic illnesses in diabetes and high blood pressure has quantifiable advantages, like facilitation of collaborative decision-making. CDSS and computer-based health platforms supported by AI enhance glycemic control, blood pressure, and drug adherence. Certain major hurdles need to be overcome for successful and ethical implementation.

Table 1: Documented Barriers to AI Integration in Chronic Disease Management.

Barrier	Description
Algorithm Transparency	Many AI models operate as "black boxes," limiting clinical interpretability
Workflow Integration	AI tools often lack seamless integration with existing Electronic Health Records (EHRs)
Data Privacy and Security	Concerns regarding patient data protection and regulatory compliance
Health Equity Concerns	Risk of algorithmic bias, unequal access to AI tools in underserved populations

Explainability and Trust

Clinicians need transparent, understandable AI suggestions to guide decision-making. Transparency of AI-algorithms, particularly those relying on sophisticated machine learning systems, erodes the confidence of clinicians and may restrict the practical application of these tools in day-to-day situations.⁷

Workflow Integration

Optimistic utilisation of AI in chronic care requires unobtrusive incorporation into electronic health records and the current clinical workflow. Tasks that need manual entry or enforcement beyond day-to-day systems are more likely to be deployed at scale.^{3,15}

Data Privacy and Ethical Issues

AI systems that manage patient information are governed by data protection legislation like the Health Insurance Portability and Accountability Act (HIPAA) and the General Data Protection Regulation (GDPR). Ethical issues involve data protection, consent, and prejudice in AI training sets that may result in unequal outcomes of care.¹⁶

Equity and Access

AI tools need to be tested on heterogeneous patient groups so that they do not amplify existing health disparities. Algorithmic bias, being common because minority groups are underrepresented in training data, can result in discriminatory recommendations.¹⁷ AI-based care requires universal access to move towards the goal of health equity.

FUTURE RESEARCH RECOMMENDATIONS

There needs to be more studies in the following areas:

- Longitudinal assessment of the effect of collaborative decision-making technology using AI on patient clinical outcomes, quality of life, and healthcare expenditures.
- Establishment of standard frameworks for measuring the safety, effectiveness, and ethical acceptability of AI-based systems used in chronic care.
- Patient trials of implementing AI-supported decision making with a focus towards continued design refinement and acceptability of such technologies.
- Prospective testing of practice in scalability and flexibility in varied healthcare settings.

CONCLUSION

Artificial intelligence-enhanced clinical decision-making is an advanced technology for chronic condition management, such as diabetes and hypertension. There is evidence currently in favour of the application of AI-enhanced electronic patient self-management programs and AI-assisted clinical decision support systems in a bid to improve clinical outcomes, patient activation, and treatment regimen compliance.

But successful adoption in clinical practice hinges on addressing explainability issues, clinician credibility, workflow embedding, privacy, and health equity. There needs to be some inter-coordination among clinicians, patients, policymakers, and technology developers about the practical and ethical deployment of AI for chronic care management. Subsequent studies need to prioritise very, very highly pragmatic clinical trials, governance ethics frameworks, and disparity-resolution strategies for access and outcomes. With that, AI can assume a central role in reengineering chronic care, in turn leading to improved health outcomes for the diabetic as well as the hypertensive.

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