Artificial Intelligence in Healthcare: Enhancing Shared Decision-Making, Patient Autonomy, and Physician Expertise in the Era of Generative and Agentic AI

Mr. DANDU JAYABHARATH REDDY

Assistant Professor, Bachelor of Science in Information Technology, Sambhram University, Jizzax, Uzbekistan,

Email ID: bharath55.edu@gmail.com

MUSTAFAQULOVA MUHAYYO SALOHIDDIN QIZI

(BSc.IT), student, Bachelor of Science in IT, Sambhram university, Jizzax, Uzbekistan

O‘KTAMOV IBROHIM SARVAR O‘G‘LI

(BSc.IT), student, Bachelor of Science in IT, Sambhram university, Jizzax, Uzbekistan

TAYIROVA AZIZA ESHPULATOVNA

(BSc.IT), student, Bachelor of Science in IT, Sambhram university, Jizzax, Uzbekistan

Abstract. The rapid advancement of artificial intelligence (AI), particularly Generative AI and Large Language Models (LLMs), is transforming healthcare decision-making processes. This paper examines the integration of AI into shared decision-making (SDM), focusing on its implications for patient autonomy, physician expertise, and clinical judgment. The study analyzes three key dimensions: explainability in AI systems, the impact of AI-generated recommendations on patient decision-making, and the influence of AI on physician expertise, including risks such as automation bias and deskilling. Building on recent developments in Explainable AI (XAI), multimodal AI systems, and agentic AI, this paper proposes a conceptual framework for human-centered AI integration in healthcare. The findings suggest that AI can enhance decision-making by reducing cognitive load, structuring complex information, and supporting collaboration between patients and physicians. However, challenges related to transparency, trust, and ethical governance must be addressed. The study concludes that

AI should augment rather than replace human expertise, ensuring responsible and effective adoption in clinical environments.

Keywords: Artificial Intelligence in Healthcare; Generative AI; Large Language Models (LLMs); Shared Decision-Making (SDM); Explainable AI (XAI); Patient Autonomy; Physician Expertise; Human-AI Collaboration; Ethical AI

1. Introduction

Artificial Intelligence (AI) has emerged as a transformative force in healthcare, driven by advancements in machine learning, deep learning, and Generative AI technologies. Modern AI systems are capable of performing complex tasks such as disease diagnosis, treatment recommendation, risk prediction, and personalized medicine.

Recent developments in Large Language Models (LLMs) and agentic AI have further expanded these capabilities by enabling context-aware reasoning, multimodal data processing, and real-time decision support. These systems can integrate diverse data sources, including medical imaging, clinical records, and patient history, to generate comprehensive insights.

Despite these advancements, integrating AI into healthcare raises significant ethical and practical concerns, particularly in Shared Decision-Making (SDM). SDM requires collaboration between patients and physicians, emphasizing transparency, trust, and informed consent. However, AI systems—especially complex models—often lack explainability, making it difficult for users to understand how decisions are made.

This study explores the impact of AI on SDM by focusing on three key dimensions:

- Explainability and transparency in AI systems
- Patient autonomy and cognitive decision-making
- Physician expertise and professional responsibility

The objective is to provide a structured and updated perspective on how AI can be responsibly integrated into healthcare decision-making processes.

2. AI-Driven Shared Decision-Making in Healthcare

Shared decision-making (SDM) is a fundamental principle of patient-centered healthcare, where patients and physicians collaboratively determine treatment options. AI has the potential to enhance SDM by improving access to information, reducing uncertainty, and enabling evidence-based decisions.

A critical requirement for effective SDM is **explainability**. Patients and physicians must understand how AI systems generate recommendations. While traditional models offer interpretability, modern deep learning systems often rely on post hoc Explainable AI (XAI) techniques to provide insights into decision-making processes.

AI systems can also help manage **cognitive overload**, a common challenge in complex medical scenarios. Patients are often required to process large volumes of medical information, which can hinder effective decision-making. AI can structure and prioritize this information, making it more accessible and easier to interpret.

However, AI-generated treatment recommendations—especially ranked suggestions—raise concerns about influencing patient choices. While critics argue that such systems may limit autonomy, they can also support informed decision-making when combined with physician guidance.

Thus, AI should be viewed as a **decision-support tool** that enhances, rather than replaces, human judgment in SDM.

3. Challenges and Risks of AI Integration in Clinical Practice

The integration of AI into healthcare introduces several challenges that affect both patients and physicians.

3.1 Automation Bias

Automation bias occurs when users over-rely on AI recommendations, potentially leading to errors if the system provides incorrect outputs. This can reduce critical thinking and independent decision-making.

3.2 Deskilling of Physicians

As AI systems take over routine tasks, physicians may experience reduced opportunities to develop and maintain essential clinical skills. Medical expertise relies heavily on experience and contextual judgment, which may decline with excessive automation.

3.3 Lack of Explainability

Many AI systems function as "black boxes," making it difficult to understand how decisions are made. This lack of transparency can undermine trust and accountability in clinical settings.

3.4 Ethical Concerns and the "Actuarial Turn"

AI systems rely on statistical predictions, which may prioritize efficiency over individualized patient care. This shift toward data-driven decision-making—referred to as the "actuarial turn"—can conflict with core medical ethics such as autonomy and beneficence.

3.5 Data Bias and Reliability Issues

AI models trained on biased datasets may produce inaccurate or unfair outcomes, affecting patient safety and treatment quality.

4. Methodology / Conceptual Framework

This study adopts a conceptual and analytical approach to examine the integration of AI into healthcare decision-making. The proposed framework focuses on **human-AI collaboration within SDM**.

4.1 Framework Components

The conceptual framework consists of three main layers:

1. **AI Layer**
    - Generative AI and LLMs
    - Explainable AI (XAI) mechanisms
    - Multimodal data processing

2. **Human Interaction Layer**
    - Patient decision-making processes
    - Physician expertise and clinical judgment
    - Communication and trust
3. **Integration Layer**
    - Shared Decision-Making (SDM)
    - Ethical governance and transparency
    - Human oversight and accountability

4.2 Decision Flow

1. AI processes patient data and generates recommendations
2. XAI techniques provide explanation of outputs
3. Physicians interpret and validate AI suggestions
4. Patients engage in informed decision-making
5. Final decision is made collaboratively

This framework ensures that AI supports clinical decisions while maintaining human control and ethical responsibility.

5. Discussion

The integration of AI into healthcare decision-making presents both opportunities and challenges.

From a patient perspective, AI can enhance autonomy by simplifying complex information and reducing cognitive burden. However, excessive reliance on AI recommendations may subtly influence patient choices.

From a physician perspective, AI can improve efficiency and diagnostic accuracy but may also introduce risks such as automation bias and deskilling. Maintaining a balance between AI assistance and human expertise is essential.

The study highlights the importance of **human-centered AI design**, where systems are developed to support collaboration rather than replace human decision-making. Explainability, transparency, and ethical governance play critical roles in achieving this balance.

Overall, the effectiveness of AI in healthcare depends on how well it is integrated into clinical workflows and aligned with human values.

6. Conclusion and Future Work

This paper examined the impact of advanced AI technologies on shared decision-making, patient autonomy, and physician expertise in healthcare. The findings indicate that AI has the potential to significantly enhance healthcare decision-making when implemented responsibly.

AI systems can improve decision quality, reduce cognitive overload, and support collaboration between patients and physicians. However, challenges such as automation bias, lack of explainability, and ethical concerns must be carefully managed.

Future work will focus on:

- Developing more transparent and interpretable AI models
- Enhancing human-AI interaction design
- Expanding multimodal AI systems in clinical practice
- Establishing regulatory frameworks for ethical AI use

Ultimately, the goal is to ensure that AI strengthens human agency and contributes to more effective, patient-centered healthcare systems.

References

- Ashish Vaswani, A., et al. (2017). *Attention is all you need*. Advances in Neural Information Processing Systems (NeurIPS).
- Tom B. Brown, T. B., et al. (2020). *Language models are few-shot learners*. NeurIPS.

- European Union. (2016). *General Data Protection Regulation (GDPR)*.
- Finale Doshi-Velez, F., & Been Kim, B. (2017). *Towards a rigorous science of interpretable machine learning*. arXiv preprint.
- Zachary C. Lipton, Z. C. (2018). *The mythos of model interpretability*. Queue, 16(3).
- Eric J. Topol, E. J. (2019). *Deep Medicine: How Artificial Intelligence Can Make Healthcare Human Again*. Basic Books.
- Enrico Coiera, E. (2019). *The impact of AI on the practice of medicine*. The Lancet Digital Health, 1(6).
- Michael A. Shortliffe, M. A., & Sepúlveda, M. J. (2018). *Clinical decision support in the era of AI*. JAMA.
- Alvin Rajkomar, A., et al. (2019). *Machine learning in medicine*. New England Journal of Medicine.
- David S. Char, D. S., Shah, N. H., & Magnus, D. (2018). *Implementing machine learning in healthcare*. NPJ Digital Medicine.
- Brian J. Zikmund-Fisher, B. J., et al. (2017). *Communicating risk and uncertainty in healthcare*. Medical Decision Making.
- World Health Organization. (2021). *Ethics and governance of artificial intelligence for health*.
- European Commission. (2021). *Ethics guidelines for trustworthy AI*.
- Cynthia Rudin, C. (2019). *Stop explaining black box models for high stakes decisions*. Nature Machine Intelligence.
- Sendhil Mullainathan, S., & Obermeyer, Z. (2016). *Predictive analytics in healthcare*. Science.
- Klaus Schwab, K. (2017). *The Fourth Industrial Revolution*. Crown Publishing.