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Artificial Intelligence in Healthcare Decision-Making: Enhancing Clinical Outcomes and Operational Efficiency

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Abstract: *This study investigates the transformative potential of artificial intelligence (AI) in healthcare decision-making, focusing on its dual capacity to enhance clinical outcomes and operational efficiency. Through a mixed-methods approach combining quantitative surveys and qualitative feedback from 160 stakeholders—including clinicians, administrators, patients, and AI developers - the research evaluates perceptions of AI's benefits, challenges, and ethical implications. Findings reveal strong consensus on AI's ability to improve diagnostic accuracy (mean rating = 4.12/5) and reduce medical errors (mean = 4.05/5), aligning with prior studies demonstrating AI's superior pattern recognition in diagnostics and predictive analytics. Operationally, participants highlighted AI's role in reducing administrative burdens (mean = 4.28/5) and optimising resource allocation (mean = 4.02/5), though scepticism persists about cost-saving potential (mean = 3.87/5).*

Despite these advantages, critical barriers hinder widespread adoption. Trust deficits emerged as a central concern, with patients expressing reservations about AI's ability to contextualise care (e.g., "Machines lack human empathy"), while clinicians emphasised the "black box" problem in algorithmic decision-making. Ethical risks, particularly algorithmic bias and data privacy vulnerabilities, were cited by 45% of participants as unresolved challenges. Technical barriers, including interoperability issues and staff training gaps, further complicate implementation, especially in rural and underserved settings.

The study underscores AI's role as a collaborative tool rather than a replacement for human expertise, emphasising its value in automating routine tasks to free clinicians for complex decision-making. Key recommendations include adopting transparent AI models, prioritising equity in system design, and implementing phased adoption strategies to balance innovation with ethical accountability..

Keywords: Artificial intelligence, clinical decision-making, operational efficiency, healthcare outcomes, algorithmic bias, mixed-methods research, stakeholder perceptions

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