

Clearing the fog: A systematic literature review on the ethical issues surrounding artificial intelligence based medical devices

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Introduction: Artificial Intelligence (AI), the capacity for computers to mimic human intelligence, is among the main drivers of the Fourth Industrial Revolution and is set to transform the healthcare sector. Most medical-AI utilizes machine learning for specific tasks, for example in clinical decision support systems and robotics. However, this has sparked debate among philosophers, ethicists, regulators, and policymakers who have raised concerns regarding the ethical implications. Whilst several global initiatives for AI regulation and development exist, these are still in their infancy, and policy differs between nations. There is also a requirement for continuous training and education in technical and ethical aspects of medical AI for healthcare workers, biomedical engineers, technicians, policymakers, and bioethicists.

Objectives: To identify key ethical themes concerning use of AI-based medical technologies and the proposed solutions.

Methods: A systematic search was conducted in April 2022 using Scopus to identify studies discussing ethics of AI-based healthcare technology. Only English language and freely available studies were included; Reviews and grey literature were excluded. Three investigators independently screened studies by title, abstract, and full text, before using an ad-hoc extraction table to facilitate narrative synthesis.

Results: Of 1574 studies identified, 41 met criteria for final review. Studies covered a range of contexts and technologies. The main ethical themes concerning medical technology, in order of frequency, included: transparency, algorithmic bias, confidentiality, fairness, trust, autonomy, accountability, and informed consent. The proposed solutions included multidisciplinary development approaches, standardization of framework, regulation, and policy, and AI education for healthcare professionals and users.

Conclusions: This review highlights the importance of increasing ethical awareness through interdisciplinary research, such that developers and regulators have the necessary tools to ensure consideration of ethical issues in the design of AI technologies. Interdisciplinary research, regulation, and implementation may help ensure AI-based medical technology is ethical, effective, and safe.

