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Ethical Challenges and Patient Engagement Using AI in Health Communication: A Review Study

Abstract

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Keywords: Health Communication, AI integration, Ethical Challenges, Health Care, Digital Health Platforms

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Title

Ethical Challenges and Patient Engagement Using AI in Health Communication: A Review Study

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Contents

Abstract

AI transformed healthcare communication. Conversational AI utilizes ChatGPT and other large language models more frequently. This technology finds personalized health data, expanding options. Intelligent technologies help people understand their health by teaching medical ideas and giving interactive support. AI improves patient care and workflow. AI improves patient-provider communication, raising legal, ethical, and regulatory issues. The research addresses these issues. This investigation identified studies that used PRISMA-compliant systematic reviews. A search of Google Scholar, Taylor & Francis, Elsevier, PubMed, and others yielded 50 hits. Native studies enable academics to evaluate AI in health communication as a whole. The studies identified issues related to ethical concerns, data privacy, and the preparation of healthcare professionals. The paper provides a health communication AI conceptual framework for planned, moral progress. AI must be invented,used, and applied equitably, responsibly, transparently, and ethically to maximize its revolutionary promise while respecting patient rights and promoting equitable public health.

Keywords:

Health Communication, AI integration, Ethical Challenges, Health Care, Digital Health Platforms

Introduction

With artificial intelligence (AI) emerging as a revolutionary force across numerous sectors, radically changing the landscapes of industries (Younis et al, 2024), the beginning of the twenty-first century has seen an age of hitherto unheard-of technical advancements. Observing the fast change of artificial intelligence and related technologies in every sphere of medical practice, research, and healthcare delivery, the healthcare profession is on the edge of a severe paradigm shift in this period of technological revolution (Davenport & Kalakota, 2019). AI has great potential to raise the quality,

efficiency, and accessibility of health care from boosting diagnostic capabilities and coordinating treatment regimens to simplifying administrative tasks and expediting medication discovery (Davenport & Kalakota, 2019).

Delivering the best possible care, enabling informed decision-making, encouraging patient compliance with treatment procedures, and finally helping to produce better health outcomes depend on communication (Botha et al, 2024). Including artificial intelligence in health communication systems creates new opportunities to surpass traditional constraints, offering personalized and accessible health information and interventions to different populations worldwide (Sezgin & Kocaballi, 2024).

Emerging generalist conversational artificial intelligence (CAI) completes numerous conversational tasks with human-like replies (Sezgin & Kocaballi, 2024). Large language models (LLMs), such as ChatGPT, possess the unique ability to generate human-readable content, rethink clinical practices, and enhance interactions among medical personnel, patients, and medical information. During emergencies like pandemics, the chatbots give fast health-related information to help surgical consultations, increase the efficiency of dental clinics, enable medical education, and even diagnose diseases (Younis et al., 2024; Botha et al., 2024).

The promise of artificial intelligence in health communication is tied to a complicated web of ethical questions and issues that need to be investigated and preventative efforts started (Momani, 2024). Data security and privacy are becoming increasingly important as artificial intelligence systems are increasingly integrated into the infrastructure supporting health communications (Fröling et al., 2024). Concerns about ethical implications, copyright, transparency problems, and the possibility of bias with tools like ChatGPT point to areas that need active frameworks and answers (Wah, 2025; Agathokleous & Saitanis, 2023; McGowan et al., 2023). Transparency of AI decision-making, accountability and responsibility for AI-caused error or misinformation, and the possible impact on patient freedom and the patient-provider relationship (Sezgin & Kocaballi, 2024; Younis et al., 2024) come first. Algorithmic discrimination and biased service potential, as described by Sezgin & Kocaballi (2024), also come first.

This review aims to map the current scene of AI applications in health communication with regard to the milestone contributions of AI to health communication and the accompanying ethical problems. The multifaceted ways in which artificial intelligence improves health communication, patient-provider communication, and patient involvement (Botha et al, 2024) are described in this paper. Second, by use of established ethical norms and standards, this study offers a critical discourse on the moral issues generated by the increasing engagement of artificial intelligence in this industry, thereby identifying areas of concern and hazards to patient rights and safety (Momani, 2024).

Following the PRISMA (Preferred Reporting Items for Systematic Reviews and Meta-Analyses) guidelines, the design of the study used in this systematic review guaranteed a systematic procedure (Singhal, Neveditsin, Tanveer, & Mago, 2024). To answer the objectives of this review, the gathered papers underwent extensive screening processes, data extraction, and synthesis (Younis et al, 2024). By using artificial intelligence in the health industry, a conceptual model is suggested for raising patient involvement and strengthening health communication.

Research on the legal accountability for breaches carried out with AI technologies (Aristova et al., 2019; Filipenko & Lukashevych, 2023) is also a must. Establishing public confidence, safeguarding patient rights, and fully using artificial intelligence in health communication depends on securing the FATE development and use of AI in health communication.

In conclusion, despite all these obstacles, artificial intelligence has great potential to support patient involvement and enhance health outcomes and massive improvements. These may be customized to fit personalized patients' needs, preferences, and degree of literacy (Sezgin & Kocaballi, 2024). AI's capacity to drive administrative duties from healthcare practitioners and automate communications operations might also spare vital time for longer, more significant patient encounters, therefore improving the patient's experience generally (Botha et al, 2024; Younis et al, 2024; Fröling et al, 2024). From virtual

health care to drug development and pandemics like COVID-19, artificial intelligence is crucial in research. Its potential in health communication is undeniable.

Research Question

1. RQ_1. How can AI-driven tools improve patient engagement in healthcare communication?
2. RQ_2.What are the key ethical concerns associated with AI-generated health communication, and how can they be addressed?

Review of Literature:

Patient Engagement and Health Communication Driven by AI

Artificial intelligence (AI) applied in health communication has transformed patient interaction with healthcare providers and medical knowledge reception. Through the provision of real-time, customized health advice, AI-driven apps such as chatbots, virtual assistants, and natural language processing (NLP) systems have greatly increased patient involvement (Denecke et al., 2019). To reduce the burden on healthcare workers, AI-based chatbots have been widely deployed to provide personalized medical help 24/7, symptom evaluations, and appointment booking.

Particularly for the treatment of chronic diseases, studies show that AI-based virtual assistants can help patients with self-management and education (Younis et al., 2024). Personalized health information, symptom monitoring, and medication reminders made possible by these technologies let patients access improved health outcomes (Thorat et al., 2024). Furthermore used in dental communication are AI-powered platforms, which help to overcome language hurdles, patient fear, and understanding by means of interactive, graphic depictions of the operations (Thorat et al., 2024). Combining the data on how artificial intelligence could boost patient involvement, this review provides valuable insights for legislators, healthcare professionals, and technology entrepreneurs hoping to apply AI to improve patient care (Mago, 2024).

Research indicates that, particularly in cases involving empathy, complex decision-making, or in-depth medical discussions, AI-based communication technologies are not necessarily suitable replacements for human communication (Traylor et al., 2025). Although AI chatbots excel in providing structured, evidence-based responses, their capacity to offer emotional support is limited, and their appropriateness in mental health and palliative care settings is called into question (Wah, 2025). By simplifying medical information and thereby enhancing comprehension levels, artificial intelligence technologies contribute to improving patient education (Nasra et al., 2024). The application of AI in virtual patient management and decision-making processes streamlines workflow, enabling greater personalization and effectiveness in patient interactions (Islam, 2024; Bergemann et al., 2024).

Ethical and Privacy Concerns in Artificial Intelligence Health Communication

AI raises ethical and privacy concerns even as it has significantly enhanced patient communication. Among the primary issues are data security and patient confidentiality, as artificial intelligence-enabled systems manage vast amounts of private medical information (Arbelaez Ossa et al., 2024). Preventing data leakage and unauthorized access to information (Kewalchand, 2024) relies on consistent adherence to regulations such as the General Data Protection Regulation (GDPR) and the Health Insurance Portability and Accountability Act (HIPAA).

Algorithmic prejudice in AI-based healthcare communication presents another major ethical issue. Studies show that by producing less effective recommendations for under-represented populations, AI models taught on biased or incomplete datasets might worsen healthcare inequalities (Denecke et al., 2019). AI diagnostic and treatment recommendation tools, for instance, have demonstrated poorer accuracy for racial minorities and non-native English speakers, therefore suggesting the need for more inclusiveness in training AI models (Arbelaez Ossa et al., 2024).

Moreover, a significant obstacle to the broad acceptance of AI-informed health communication remains the patient's confidence in it. Studies indicate that individuals frequently reject AI-generated medical advice, especially when they disagree with human healthcare practitioners

(Traylor et al., 2025). The lack of transparency regarding how artificial intelligence makes decisions only aggravates the mistrust, highlighting the need for explainability and accountability in AI-driven healthcare solutions (Ng Kok Wah, 2025). While simultaneously raising ethical concerns, the use of artificial intelligence (AI) in health communication is transforming patient involvement. This literature review encompasses major findings from a range of studies and acknowledges the ethical issues associated with the implementation of artificial intelligence and its impact on patient relationships. The limitations of artificial intelligence in providing cognitive empathy necessitate a supplementary role alongside human providers (Mullaj, 2024; Chustecki, 2024). Ensuring fairness and avoiding biases in healthcare outcomes relies on diverse data representation and transparency in AI algorithms, which are essential (Bergemann et al., 2024; Chustecki, 2024).

By means of on-demand support, response to common inquiries, and patient navigation of complicated health information, virtual health assistants and chatbots can improve access to treatment and encourage proactive management of health (Wah, 2025).

Apart from involving patients more actively, artificial intelligence offers strong instruments for addressing important medical problems. AI does remarkably well in deciphering complex medical pictures for diagnosis (Kumar, 2024). Furthermore, helping medical and administrative staff in collecting information, anticipating results, and interpreting medical data (Secinaro et al., 2021). Particularly in areas where access to healthcare services is limited, AI-assisted remote monitoring systems can use powerful machine learning algorithms and wearable devices for the treatment of chronic illnesses (Wah, 2025).

By means of clearer, more personalized, and interactive medical information, generative AI technologies, which are embodied by applications like ChatGPT, are transforming patient education and helping patients to become more active participants in their healthcare (Traylor et al., 2025). AI advice might unintentionally lead patients to put crucial decision-making responsibilities on algorithms, therefore reducing their participation in their healthcare activities. This action raises doubts about informed consent and the extent to which patients understand the inclusion of artificial intelligence into their treatment plans. Furthermore, even if artificial intelligence might significantly increase access by means of timely information transmission, too much reliance on such technologies runs the risk of eradicating the priceless human element of care, in which empathy and personal touch are indispensable in healing (Taylor, 2025). As we negotiate this transforming terrain, finding a balance between using AI's capabilities and safeguarding the fundamental features of the patient-provider relationship becomes very critical.

Artificial intelligence (AI) incorporation into healthcare presents both major ethical issues and great potential for development. Ensuring justice and fairness is one of the main issues of healthcare artificial intelligence addresses. Weiner et al. (2024) highlight how AI systems trained on non-representative data could reinforce or aggravate already existing biases, therefore affecting access to and quality of treatment for underprivileged groups. A startling example comes from an Obermeyer et al. (2019) study showing that a commonly used algorithm had racial prejudice, therefore, perhaps depriving Black patients who were sicker than their white counterparts of extra treatment.

Methodology:

Research Framework

This study investigates the whole function of artificial intelligence in health communication by means of a thorough literature review, including primary data collection. This approach enables in-depth research of patient viewpoints, identification of important themes and difficulties, and a general awareness of the present prospects.

Systematic Review Approach

The paper maps the frame of current research on artificial intelligence applications in health communication, ethical issues, and the effect of AI-driven communication tactics on patient involvement using a thorough systematic review approach. This strategy follows exact and open procedures for thoroughly choosing pertinent research papers.

Search Strategy:

Stage I

Database Search: Using Google Scholar, Taylor & Francis, Elsevier, and PubMed among many electronic databases, a thorough search strategy was created and followed, producing 80 entries. These databases were selected to include a broad spectrum of material in artificial intelligence, health communication, and allied disciplines. Keywords like artificial intelligence, machine learning, health communication, patient involvement, ethics, and related ideas were included in the search phrases.

Duplicate Removal: Following the initial search, six duplicate entries were eliminated through Mendeley, providing 74 original records.

Screening: Based on predetermined inclusion and exclusion criteria, the titles and abstracts of the remaining 74 records were reviewed for significance. The criteria guaranteed the choice of peer-reviewed publications, emphasizing the uses, ethical issues, and effects on patient involvement of artificial intelligence in health communication.

Articles Not Included (Irrelevant): The screening approach resulted in the exclusion of 24 irrelevant papers, therefore leaving 50 papers for a full-text examination. The choice of papers from several databases and approaches allowed us to generalize the results of our investigation.

Table 1

Inclusion and exclusion Criteria

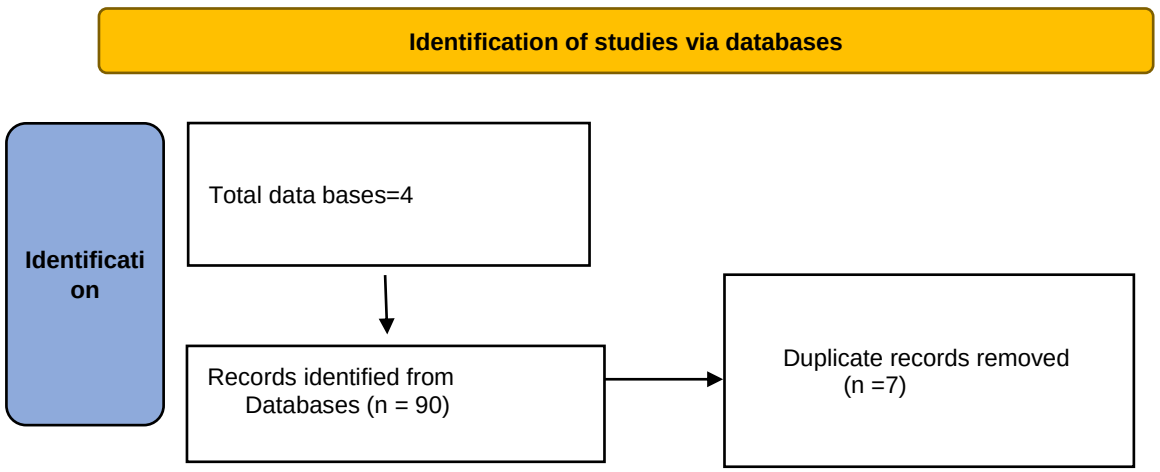
Inclusion Criteria	Exclusion Criteria
Papers in English or with English translations	Papers not in English or without English translations
Sources: Google Scholar, Taylor and Francis, Elsevier, and PubMed. Publication date: 2018 to 2025	Sources other than Google Scholar, Taylor and Francis, PubMed, and Elsevier Publications before 2018
Articles focusing on AI in health communication	Articles solely about health communication without an AI component
Articles addressing ethical challenges and patient engagement in AI health communication	Articles not addressing ethical challenges and patient engagement in AI health communication

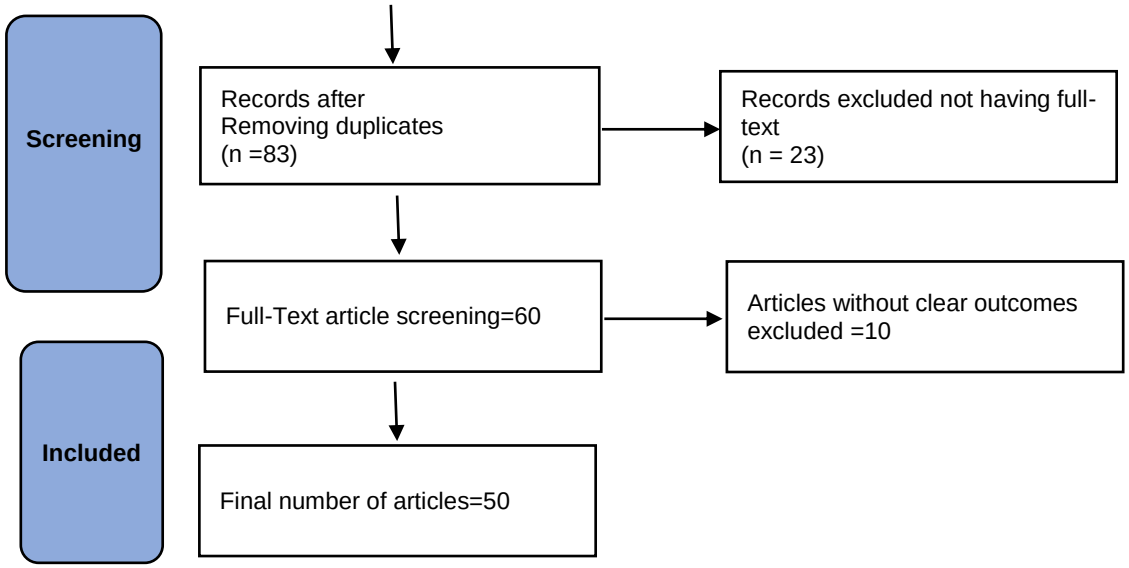
Stage II

The visual depiction of the selection process of literature across several stages to explain how researchers chose, examined, and included articles in their study is a PRISMA flowchart (Fig. 1).

Figure 1

PRISMA Flow Chart





Eligibility Criteria and Screening

We included articles published from 2018 to 2025. These were: 1) primary literature or 2) reviews (scoping reviews, systematic reviews, or meta-analyses). Articles that did not fulfill these inclusion criteria were excluded. The cut-off of 2018 was applied as this encompasses the past seven years, the timescale relevant to rapid technological advances such as AI. References were brought into Mendeley, and duplicates were deleted. The first phase consisted of screening titles and abstracts against inclusion criteria. Full-texts of included articles were acquired and thoroughly studied in a second round of eligibility. The articles fulfilling the selection criteria were included in this review.

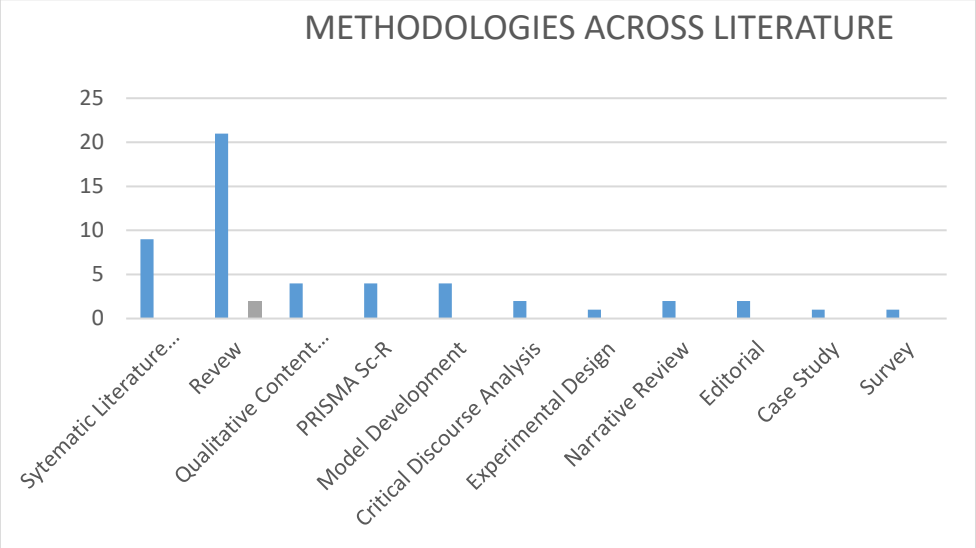
Figure 2

Research Methodologies Employed in Selected Studies

Data Analysis and Discussion:

Primary Data Analysis

Based on the selected studies, the diverse methodologies used gave our study reliability and validation.



The study selected multiple research articles with various methodologies to explore the landscape of AI in health communication These reviews explored various aspects, including the applications of AI in health communication and healthcare (Gazquez-Garcia et al., 2025; Botha et al.; Secinaro et al., 2021), the expertise required for healthcare professionals to integrate AI into practice (Gazquez-Garcia et al., 2025), the impact of generative AI on patient literacy and the patient-physician relationship (Traylor, 2024; Botha et al.), and the positive effects and challenges of AI tools in patient care (Botha et al., 2024; Singhal et al., 2024; Thorat et al.; Smallman; Wah, 2025). Some reviews employed bibliometric analysis (Secinaro et al., 2021) to quantitatively explore the research landscape by analyzing publication trends, authors, journals, and keywords (Secinaro et al., 2021). Corresponding to these approaches, one study applied Critical Discourse Analysis (CDA) (Arbelaez Ossa et al., 2024) to examine how AI ethics are built and framed within healthcare AI guidelines (Arbelaez Ossa et al., 2024), providing insights into the primary social ideologies shaping the discourse (Arbelaez Ossa et al., 2024). The inclusion of articles applying quantitative, qualitative, and mixed methods (Botha et al., 2024; Thorat et al.), along with case studies and analyses of clinical trials (Traylor, 2024; Gazquez-Garcia et al., 2025), ensures that the reviews draw on diverse types of evidence and perspectives, including those of patients, healthcare workers, and the general public (Botha et al., 2024). By combining broad data synthesis through systematic reviews, quantitative analysis through bibliometric, and critical analysis of ethical framing through discourse analysis, the selected studies comprehensively explain the current state, ethical considerations, applications, challenges, and evolving discourse around AI in health communication.

Secondary Data Analysis:

Ethical Challenges in Health Communication AI

This review study employed several methodologies to investigate ethical issues in artificial intelligence and health communication, the methodology spans literature studies and theoretical analyses, to qualitative and systematic assessments. This grid offers a concise summary of important material in the area and is a useful tool for investigating ethical conclusions of artificial intelligence in health communication. The papers present both basic and modern angles on the subject.

Table 2

Health Communication AI Ethical Challenges: Literary Inspiration on the topic

Title	Author(s)	Date	Description	Methodology
"Artificial Intelligence and Medical Ethics: Ethical	Béranger, J.	2021	Explores ethical issues in AI-driven health	Literature review and theoretical

Title	Author(s)	Date	Description	Methodology
Challenges in Digital Health Communication"			communication, such as privacy concerns and the potential for misinformation.	analysis
"AI Ethics"	Coeckelbergh, M.	2020	Examines ethical challenges of AI in various domains, including healthcare communication.	Philosophical analysis and case studies
"Ethical Challenges of AI in Health Communication: A Systematic Review"	Guo, C., et al.	2022	Systematically reviews the literature on ethical challenges of AI in health communication, identifying key themes and gaps.	Systematic literature review
"Ethical Implications of Conversational AI in Health Care"	Luxton, D. D.	2019	Discusses ethical considerations of using AI chatbots and virtual assistants in healthcare communication.	Conceptual analysis and case examples
"Ethical and Regulatory Challenges of Research Using Pervasive Sensing and Other Emerging Technologies: IRB Perspectives"	Nebeker, C., et al.	2019	Explores ethical challenges in using AI and other emerging technologies in health research communication.	Qualitative study (interviews with IRB members)
"Artificial Intelligence, Machine Learning, and Health Systems"	Panch, T., et al.	2019	Examines ethical implications of AI and machine learning in health systems, including communication aspects.	Literature review and policy analysis
"Ethics of Artificial Intelligence in Global Health: Explainable AI and the Future of Trust in Global Health"	Reddy, S., et al.	2020	Discusses the importance of explainable AI in building trust in global health communication.	Conceptual analysis and case studies
"Ethical Dimensions of Using Artificial Intelligence in Health Care"	Rigby, M. J.	2019	Explores ethical considerations of AI in healthcare, including patient-provider communication.	Literature review and ethical analysis
"Artificial Intelligence in Healthcare: A Critical Analysis of the Legal and Ethical Implications"	Schönberger, D.	2019	Analyzes legal and ethical implications of AI in healthcare, including communication-related challenges.	Legal and ethical analysis
"How AI Can Be a Force for Good"	Taddeo, M., & Floridi, L.	2018	Discusses potential benefits and ethical challenges of AI in various domains, including health	Conceptual analysis and policy recommendations

Title	Author(s)	Date	Description	Methodology
			communication.	
"Digital Health: Meeting the Ethical and Policy Challenges"	Vayena, E., et al.	2018	Examines ethical and policy challenges in digital health, including AI-driven communication.	Policy analysis and ethical framework development
"Sharing Health Care Data With Digital Giants: Overcoming Obstacles and Reaping Benefits While Protecting Patients"	Wachter, R. M., & Cassel, C. K.	2020	Discusses ethical challenges and potential benefits of sharing health data with tech companies for AI-driven communication.	Policy analysis and expert opinion

Ethical Problems in Health Communication and Artificial Intelligence

Including artificial intelligence (AI) in healthcare environments and health communication creates a difficult network of ethical questions. These difficulties need examination and sensible solutions to guarantee responsible and logical execution for the advantage of society and patients.

Data Privacy and Security

Given how increasingly AI systems are entwined into health communication, issues of data privacy and security take priority. Essential includes maintaining patient data confidentiality and following rules like HIPAA and GDPR. The study of the literature raises issues about the protection of personal data (Carter, 2018). Taylor (2025) likewise emphasizes ethical consequences.

Algorithmic Bias and Prospective Discriminatory Services

Often resulting from non-representative data, AI algorithms might intensify already existing prejudices. This begs questions about possible biased services. Char et al. (2020) underlined especially the difficulty of algorithmic biases in artificial intelligence models. Observed is racial bias in an algorithm applied to control population health (Obermeyer et al., 2019). Among the four main ethical concerns is addressing algorithmic biases and fairness. AI biases also provide a major obstacle for generalist conversational AI assistants placed in messaging applications (Wah, 2025; Sezgin et al., 2024).

Explicability and Transparency

A major ethical difficulty is ensuring openness and explainability of AI decision-making procedures. Patients ought to be aware of how artificial intelligence fits into their treatment. Furthermore, discussed in the framework of artificial intelligence and decision-making is the explicability concept (Floridi et al., 2018). Reducing the hazards and advocating values of justice and equality in public health AI messaging services depends on transparency, therefore (Sezgin et al., 2024).

Accountability and Responsibility

Determining blame and liability for mistakes linked to artificial intelligence is challenging. In healthcare environments, decisions taken by chatbots might have real-life effects, hence, it can be difficult to establish who is responsible for erroneous directions (Traylor, 2025). Legal and ethical issues in artificial intelligence in healthcare raise issues regarding who bears accountability (Naik et al., 2022).

Patient-Provider Relationship and Patient Autonomy

A significant issue is the possible effect on the patient-provider relationship and patient autonomy. Medical decision-making might be influenced by artificial intelligence systems, thereby underlining the need to make sure patients are informed and can agree to or opt out of AI-driven interferences (Solanki et al., 2023). Shared decision-making, a foundation of medical ethics, might be impacted by artificial intelligence (Abbasgholizadeh Rahimi et al., 2022), therefore endangering patient and doctor autonomy. Maintaining trust and communication depends on AI complements rather than replacements for

doctors. Furthermore recognized among the ethical dilemmas in smart healthcare is autonomy (Pasricha, 2022).

Misuse and Misinformation:

AI presents a major concern as it might create reasonable but possibly inaccurate medical knowledge. There are questions over the accuracy of AI's output as well as concerning possible over-reliance or misuse (Traylor, 2025). One may see the possibility of false information as a difficult ethical conundrum (Traylor, unknown year). Significant obstacles confronting generalist conversational artificial intelligence (Wah, 2025; Sezgin et al., unknown year) include risks related to disinformation.

Trust Deficit

The growing reliance on artificial intelligence raises issues concerning the loss of human empathy and confidence in healthcare. Arbelaez Ossa et al., 2024's discourse study of AI policies mostly addresses trust in artificial intelligence. Early implementation of artificial intelligence in healthcare might have ethical errors undermining public confidence (Pasricha, 2022). Maintaining confidence in the patient-physician interaction is clearly at risk (Traylor, 2025). Research on trust in healthcare artificial intelligence (Quinn et al., 2020; LaRosa & Danks, 2018; Hatherley, 2020) has shown difficulties in this regard. Maintaining patient privacy and confidence comes out as absolutely vital (Smith, 2024).

Reduced Clinician Skills

Concerns have been raised about computerized decision support systems (CDSS), an artificial intelligence application, possibly lowering the critical thinking and professional self-sufficiency of doctors (Catho et al., 2020).

Fostering public confidence, safeguarding patient rights, and realizing the full potential of artificial intelligence in responsible and fair use in health communication depends critically on addressing these ethical issues.

Conceptual Model for Effective Patient Engagement and AI in Health Communication

This model recommends a structured framework to enhance patient engagement using Artificial Intelligence (AI) in healthcare communication. It consists of five incorporated pillars: ethical foundations, patient-centered design, strategic deployment, continuous improvement, and collaborative communication, promoting trust, safety, and inclusivity.

Basic Ethical Principles and Patient Rights

AI must maintain key ethical standards, prioritizing data privacy, fairness, security, transparency, and patient autonomy (Bryman, 2012; Arbelaez Ossa et al., 2024; Botha et al., 2024; Dubberley et al., 2020; Singhal et al., 2024; Traylor et al., 2024). Following the FATE principles (Fairness, Accountability, Transparency, and Ethics) is essential. Distinct communication about AI supports informed decision-making and shared understanding across healthcare (Arbelaez Ossa et al., 2024; Botha et al., 2024).

Patient-Centric AI Design and Communication

AI systems must be comprehensive, culturally receptive, and designed with patient feedback to align with user needs and values (Arbelaez Ossa et al., 2024; Traylor et al., 2024). Transparent communication enhances understanding, trust, and patient empowerment (Botha et al., 2024; Singhal et al., 2024).

Strategic Deployment and Integration

AI tools can enhance efficiency and access, especially for unprivileged groups, through smart deployment within existing healthcare infrastructure (Traylor et al., 2024; Wah, 2025). Agreement with regulatory standards is vital for protecting safety and data reliability (Singhal et al., 2024).

Continuous Evaluation and Improvement

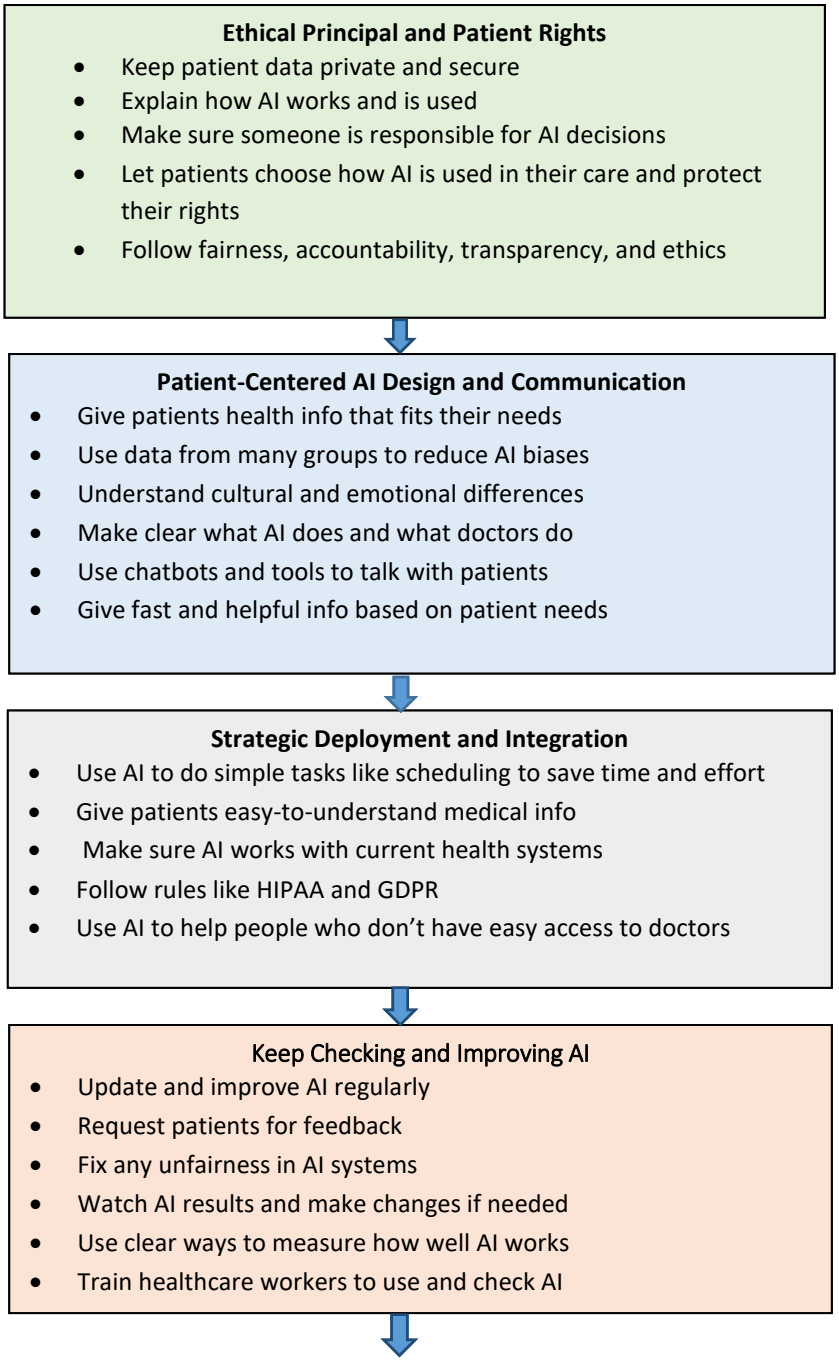
AI systems must be regularly updated using miscellaneous datasets and developed through patient feedback to reduce bias and increase reliability (Singhal et al., 2024; Gazquez-Garcia et al., 2025). Healthcare professionals should use standardized metrics to evaluate efficiency (Secinaro et al., 2021).

Collaborative System and Communication

Ethical integration of AI needs the collaboration of multi-stakeholders, with patients included in advisory roles to guide inclusive design (Arbelaez Ossa et al., 2024). Open communication promotes trust and helps counter misinformation (Singhal et al., 2024; Burke-Garcia & Soskin Hicks, 2024).

Figure 3

Conceptual Model for Effective Patient Engagement and AI in Health



Teamwork and Good Communication

- Collaborate — developers, doctors, patients, and leaders
- Encourage patients to influence how AI is utilized
- Ensuring everyone understands their role
- Engage in frequent discussions and maintain transparency about AI
- Utilize AI to combat health misinformation

Theoretical Approach to the Adoption of Artificial Intelligence in Health Communication

The inclusion of artificial intelligence (AI) in health communication involves issues of ethical application, trust, and objectivity. Its theoretical assessment relies primarily on the Diffusion of Innovations (DOI) hypothesis (Dering, 2009) which explains how social systems adapt to new technologies. When artificial intelligence is applied in health care (Burke-Garcia and Suskin-Hicks, 2024), it highlights how adoption is affected by relative advantage, relevance, and complexity. The impact of acceptance falls largely on the shoulders of early adopters and opinion leaders. (Dering, 2009).

However, with the rapid change of interventions, the increasing nature of artificial intelligence affects the diffusion model. (Arbeliz Ossa et al., 2024) Adoption is also influenced by ethical questions such as openness, bias, and accountability. (Smallman, 2022) The two essentials are trust and organizational openness. Without them, the deployment process may take longer than expected. (Osa et al., 2024) Adoption rates also vary by culture and health care system. Which is hindered by literacy, infrastructure, and emotional interactions. (Smallman, 2022; Waugh, 2025; Yunus et al., 2024), Furthermore, the current narrative is that artificial intelligence is "inviting and desirable". Investors can be led to early adoption without sufficient research. (Ossa et al., 2024) Therefore, even if diffusion theory remains a useful framework, it needs to be contextually adapted to solve the unique healthcare problems related to artificial intelligence.

Limitations

Many researchers admit major methodological restrictions on the breadth and depth of their findings. Budgetary restrictions resulted in research on Industry 4.0 excluding non-open-access publications, which may limit its comprehensiveness (Sima and associates, 2020). Examining artificial intelligence in patient care reveals how dependent it is on English peer-reviewed articles, which can cause one to overlook pertinent non-English sources. Moreover, the investigated studies pointed out the subjective character of the findings resulting from prejudice as well as the fact that the quality of data and training shapes the efficacy of AI instruments. (Botha et al., 2024)

A bibliographic study found only the restrictions of generic research keywords and Scopus database access. To obtain a thorough understanding of future research, it is advised to combine conference papers with databases like PubMed and IEEE. Cicero et al.,(2021) in addition to the range of pre-publication literature before the key recommendations of 2023, Arbeliz Ossa et al. (2023) identified issues about the haphazard review approach, the analysis of documents in English only, and the absence of regional guidelines from Central Asia, Latin America, and Africa. The exclusion of interpretative language obstacles was shown to be biased by Herrera-Espejo and Reich (2023). These constraints underline the necessity of multidisciplinary, comprehensive, modern research methods in general.

Conclusions

Regulatory frameworks, research patterns, and communication methods present a systematic assessment of the literature that offers a comprehensive picture of the evolving artificial intelligence (AI) landscape in the field of health. The requirement for justice, responsibility, openness, and ethics (FATE) in the field of artificial intelligence (AI) in health is highlighted in a thorough investigation by Singhal et al. (2024). Here, analytically, we investigate the methodical rules, computational techniques, and assessment processes. The study stresses the requirement for artificial intelligence systems to be very technologically advanced and also strictly ethical. In the subject of health, a bibliometric analysis by Sicinoro et al. (2021) also reveals the fast expansion and varied character of artificial intelligence research. Though the subject is drawing increased scholarly interest, their findings highlight continuous constraints mostly linked to ethical considerations, data governance, and the preparedness of healthcare professionals. These restrictions underline the need for planned and ethically based expansion (Singhal et al., 2024).

AI-supported chatbots and generative AI tools exhibit considerable potential in enhancing patients' understanding of their health issues through easily accessible and interactive platforms that make difficult medical information easy to understand (Traylor et al., 2025; Yao et al., 2023). Through careful deployment of artificial intelligence and health literacy, there is a significant potential to improve patient comprehension and education (Wah, 2025; Noteboom, 2023).

Regarding laws and regulations, Arbelaez Osa and others (2023) underlined the need to modify current legal systems to handle the special difficulties presented by artificial intelligence technology. They underline that the regulations should be robust against outside influence and crafted to be able to control large-scale regulatory projects.

Additionally, looking at the application of artificial intelligence in health communication are Hirera-Espeil and Gatch (2023), who did an exploratory study on machine translation in public health. Mostly depending on one-way textual communication. The studies highlight a vital issue for future studies, like participant recruitment or two-way communication in public health campaigns. Ensuring the fair, accountable, transparent, and ethical (FATE) development and deployment of AI is paramount to harnessing its transformative power while protecting patient rights and promoting equitable healthcare. Continued research is essential to address these complexities and guide responsible innovation.

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