

Generative artificial intelligence in healthcare: A scoping review on benefits, challenges and applications (2024)

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Introduction

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Healthcare Challenges:

- Rising healthcare costs
- Shortage of healthcare workers
- Increasing demand for personalized medicine

Role of AI: Offers solutions in diagnostics, treatment, and patient care.

Generative AI (GAI): New frontier with the potential to address these challenges.

Objectives

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- Applications of GAI in healthcare.
- Benefits offered by GAI in different domains.
- Challenges and ethical concerns related to GAI integration.

Methods

- **Scoping Review:** Based on PRISMA-ScR guidelines.
- **Databases Searched:** Scopus, PubMed, and Web of Science.
- **Study Selection:** 109 studies included after screening.
- **Keywords Used:** "Generative AI," "Healthcare," "Large Language Models."

GAI Models in Healthcare

Most Common Models:

- ChatGPT (74%)
- Google Bard (11%)
- Microsoft Bing AI (7%)

Applications Across Domains: Text generation, diagnostics, patient care.

Applications of GAI in Healthcare

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Top Applications Identified:

- Answering health-related questions (41 studies)
- Disease diagnosis and prediction (17 studies)

Other Applications:

- Clinical decision support
- Medical education and training

Benefits of GAI in Healthcare

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- **Rapid Information Access:** Quick insights for professionals.
- **Improved Diagnostic Accuracy:** Enhances disease prediction.
- **Cost Efficiency:** Automates routine tasks, reducing costs.
- **Patient Engagement:** Personalized patient care and information.

Challenges of GAI in Healthcare

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- **Inaccuracy in Generated Content:** Risk of providing fictional or incorrect information.
- **Ethical Concerns:** Data privacy, bias, and patient confidentiality.
- **Lower Accuracy in Complex Scenarios:** Struggles with nuanced cases.
- **Generalizability Issues:** Limited applicability across diverse populations.

Key Findings

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- **GAI Applications:** Most commonly used for diagnostics and answering health questions.
- **Benefits:** Focus on improving access to information, diagnostics, and patient care.
- **Challenges:** Primarily related to content accuracy, ethical concerns, and model generalizability.

Discussion

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- **Transformative Potential:** GAI can revolutionize healthcare by improving workflows and enhancing patient outcomes.
- **Key Limitations:** Ethical concerns, bias, and content accuracy must be addressed for widespread adoption.
- **Need for Further Research:** To explore GAI's potential in diverse healthcare settings.

Conclusion

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- **GAI in Healthcare:** Promising potential, but challenges like accuracy, bias, and ethical concerns remain significant.
- **Future Research Directions:** Improving model accuracy, addressing biases, and exploring ethical frameworks for AI integration.

Questions?