



Review Article

Artificial intelligence in psychiatry and mental health: A narrative review

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Abstract

The integration of Artificial Intelligence (AI) technologies in mental health care offers significant potential for enhancing diagnostic accuracy and personalizing treatment approaches. AI technologies have the capacity to analyze vast amounts of data, enabling clinicians to identify patterns and tailor interventions to individual patient needs effectively.

The growing recognition of mental health's impact on overall well-being underscores the necessity for innovative solutions, including AI, to improve care delivery and patient outcomes.

The challenges of integrating AI into mental health care include ethical concerns, data privacy issues, and the need for robust validation of AI-driven tools in clinical settings. Addressing these challenges is essential for the successful implementation of AI technologies in psychiatry. To fully harness the potential of AI in psychiatry, ongoing research and collaboration among stakeholders are crucial to navigate these complexities and ensure effective, ethical integration. Current mental health interventions often lack personalization and may not adequately address the diverse needs of patients, highlighting the necessity for more tailored approaches through AI innovations.

Keywords: Artificial Intelligence, Mental health, Psychiatry, Narrative review

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1. Introduction

The exploration of AI's role in psychiatry highlights its potential to enhance diagnostic accuracy and personalize treatment approaches. The integration of AI in psychiatry not only aims to improve patient outcomes but also addresses the growing burden of psychiatric disorders globally (Sun et al., 2023).¹ The increasing prevalence of mental health issues necessitates innovative solutions, making AI a critical tool in modern psychiatric practice. As AI technologies continue to evolve, their application in mental health is expected to expand, potentially transforming the landscape of psychiatric care and treatment. The ongoing research and development in AI applications for mental health signify a transformative shift towards more efficient, personalized, and accessible psychiatric services (Gerantia, 2024) (Mittal et al., 2023).^{2,3} This evolution promises to address significant challenges, including the early detection of disorders and the customization of therapeutic interventions, ultimately enhancing patient care and outcomes.

1.1. Definition of artificial intelligence

Artificial Intelligence refers to the simulation of human intelligence processes by machines, particularly computer systems, encompassing learning, reasoning, and self-correction. AI technologies are increasingly being utilized to analyze large datasets, facilitating early detection and personalized treatment strategies in mental health care.

1.2. Overview of psychiatry and mental health

The field of psychiatry is evolving rapidly, with AI playing a pivotal role in enhancing diagnostic tools and treatment options for various mental health disorders. AI's integration into psychiatry not only enhances diagnostic capabilities but also enables the development of personalized treatment plans, ultimately improving patient engagement and outcomes in mental health care (Gerantia, 2024).² Moreover, the use of AI technologies such as machine learning and natural language processing is expected to further refine the

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analysis and interpretation of complex patient data, leading to better-informed clinical decisions.

The potential of AI to improve mental health care is particularly evident in its ability to analyze complex data and provide insights that inform clinical decision-making, addressing the pressing need for innovative solutions in psychiatry (Eser et al., 2024) (Janardan et al., n.d.).^{4,5} As AI continues to advance, its role in mental health care will likely expand, offering new opportunities for improving patient engagement and treatment outcomes through data-driven insights. The promise of AI in mental health care is underscored by its capacity to facilitate early diagnosis and personalized treatment plans, ultimately leading to improved patient outcomes (Mittal et al., 2023) (K.P. et al., 2024).^{3,6} The integration of AI in mental health care is expected to enhance the accessibility and quality of services, addressing the critical shortage of mental health professionals globally (Eser et al., 2024).⁴ As AI technologies evolve, they will play a vital role in bridging the treatment gap and providing innovative solutions for psychiatric care. The future of AI in psychiatry is promising, with ongoing advancements likely to revolutionize patient care and address the critical challenges within mental health services.

1.3. Importance of AI in mental health

The importance of AI in mental health cannot be overstated, as it offers innovative solutions to enhance accessibility, improve diagnostic accuracy, and personalize treatment approaches for various psychiatric disorders. The integration of AI technologies in mental health services is not only a response to the increasing demand for care but also a means to provide timely interventions and personalized treatment strategies.

Furthermore, AI's ability to analyze vast datasets can significantly improve early detection and intervention strategies, addressing the urgent need for enhanced mental health care solutions (Kibibi, 2024) (Mittal et al., 2023).^{3,7} This capability is crucial given the rising prevalence of mental health issues and the pressing need for effective, scalable solutions in psychiatric care (Kibibi, 2024).⁷ The continued integration of AI in mental health care is essential for addressing the treatment gap and improving the quality of psychiatric services globally (Eser et al., 2024) (Kibibi, 2024).

2. Historical Context

2.1. Early applications of AI in mental health

The historical context of AI in mental health reveals a progression from rudimentary applications to sophisticated technologies that enhance diagnostic and therapeutic practices. The journey of AI in mental health has been marked by significant milestones, showcasing its evolution from simple algorithms to advanced systems capable of

complex analyses and personalized care. The early applications of AI in mental health laid the groundwork for innovative solutions, paving the way for more advanced technologies that continue to transform psychiatric practices. As AI technologies advance, they are expected to play an increasingly significant role in improving the quality and accessibility of mental health services, facilitating early detection and personalized care (K.P. et al., 2024). This evolution will address the critical challenges faced by the mental health sector, including the growing treatment gap and the demand for innovative solutions. This historical progression underscores the transformative potential of AI in reshaping psychiatric practices and improving patient outcomes through tailored interventions and enhanced accessibility to care.

As AI continues to evolve, its historical applications serve as a foundation for future innovations that promise to further enhance mental health care delivery and patient outcomes.

2.2. Evolution of technology in psychiatry

The evolution of technology in psychiatry reflects a growing recognition of the need for innovative solutions to meet the increasing demand for mental health services. AI's integration into this field is expected to further enhance treatment efficacy and accessibility, ultimately reshaping patient care. The ongoing advancements in AI technology are poised to redefine the standards of care in psychiatry, enabling more effective interventions and broader access to mental health resources.

This ongoing evolution highlights the necessity for continuous research and collaboration between AI developers and mental health professionals to ensure effective integration into clinical practice. This collaboration is essential for addressing the complexities of mental health care and ensuring that AI tools complement rather than replace the human touch in therapeutic settings.

3. Theoretical Frameworks

3.1. Models of AI in mental health

The application of AI models in mental health is increasingly supported by interdisciplinary research, emphasizing the importance of collaboration between technologists and mental health professionals to create effective interventions. The development of AI models in mental health has the potential to enhance treatment efficacy and accessibility while addressing the unique challenges faced by practitioners in the field. The collaborative efforts between AI researchers and mental health professionals are crucial for developing effective AI models that enhance patient care while ensuring ethical standards are maintained. The ongoing collaboration between technologists and mental health professionals will be vital in overcoming challenges and ensuring that AI

models are ethically developed and effectively implemented in clinical settings.

3.2. Cognitive behavioural models and AI

Cognitive behavioural models are increasingly utilized in AI to enhance the development of autonomous systems and improve their interaction with users. These models not only facilitate more natural interactions but also allow for adaptive behaviors that respond to changing user needs, thereby enhancing overall system performance. The integration of cognitive behavioural models into AI systems can lead to innovative approaches that improve user experience and system adaptability, ultimately resulting in more efficient autonomous agents. This integration fosters a deeper understanding of user behavior and preferences, enabling AI systems to evolve in real-time and deliver personalized experiences. This evolution is crucial for creating intelligent agents capable of navigating complex environments and forming meaningful connections with users, as highlighted by recent advancements in cognitive and behavioural neuroscience (Saxena, 2025).¹⁴

The application of cognitive behavioural models in AI exemplifies the interdisciplinary approach necessary for developing systems that not only function effectively but also resonate with human users (Saxena, 2025).¹⁴ By leveraging insights from neuroscience, AI can better emulate human-like adaptability and emotional intelligence, enhancing user trust and engagement. This approach underscores the importance of designing AI systems that not only perform tasks but also understand and respond to human emotions and intentions, fostering more empathetic interactions (Gossen et al., 2017).¹⁵ The synthesis of cognitive behavioural models with AI technologies represents a significant step towards achieving machines that can genuinely understand and interact with human emotions, thereby improving user satisfaction and trust. This integration highlights the necessity for ongoing collaboration between cognitive neuroscience and AI development to create systems that prioritize emotional responsiveness and user-centric design.

4. Applications of AI in Psychiatry

The applications of AI in psychiatry are diverse, encompassing diagnostic algorithms, therapeutic planning, and innovative interventions that enhance patient engagement and treatment outcomes.

4.1. Diagnostic tools

The use of AI diagnostic tools in psychiatry can significantly improve the accuracy and efficiency of identifying mental health disorders, ultimately leading to better treatment outcomes and patient care (Mittal et al., 2023). As AI technologies continue to advance, their integration into clinical practice will likely enhance the overall effectiveness of psychiatric assessments. The integration of AI diagnostic

tools is crucial for improving clinical decision-making, as they provide data-driven insights that support accurate identification and treatment of mental health disorders.

4.2. Treatment and intervention

AI-driven treatment interventions are transforming psychiatric care by enabling personalized therapeutic strategies that cater to individual patient needs, thereby enhancing engagement and improving overall outcomes in mental health care. (Koutsouleris et al., n.d.)⁸ AI-driven interventions are also being utilized to provide real-time support through virtual therapists, which can facilitate immediate access to care and enhance patient engagement in treatment.

These innovations in AI-driven treatment interventions not only improve patient access but also foster a more collaborative approach to mental health care, empowering individuals to take an active role in their treatment journey.

4.3. Predictive analytics

Predictive analytics in mental health care leverages large datasets to forecast patient outcomes, identify at-risk individuals, and optimize treatment plans, ultimately enhancing the quality of care provided (Singhal & Gopinathan, 2024).⁹ As AI technologies evolve, their predictive capabilities are expected to significantly improve early intervention strategies and resource allocation in psychiatric settings (Kibibi, 2024). The integration of AI in predictive analytics is crucial for addressing the growing challenges in mental health care, particularly in identifying at-risk individuals and tailoring effective treatment plans.

5. Ethical Considerations

The ethical considerations surrounding the use of AI in mental health care are paramount, necessitating careful evaluation to ensure patient safety and the integrity of therapeutic relationships.

5.1. Privacy and data security

The protection of patient data is critical, especially as AI systems increasingly handle sensitive information, raising ethical concerns regarding privacy and security in mental health care. Ensuring robust data protection measures and ethical guidelines is essential to maintain trust and safeguard patient confidentiality in the evolving landscape of AI-driven mental health care (Uzych, 2001) (Kelly, 2017).^{10,11}

5.2. Bias and fairness in AI algorithms

The ethical implications of AI in mental health care extend beyond data privacy, encompassing concerns about algorithmic bias and the potential for technology to undermine the therapeutic relationship (Kibibi, 2024). Addressing these challenges is essential to ensure that AI serves as a supportive tool rather than a replacement for

human empathy in treatment settings. The integration of AI in mental health care must prioritize ethical considerations, ensuring that patient trust is maintained while leveraging technology to enhance therapeutic outcomes and accessibility. The ethical integration of AI in mental health care requires ongoing dialogue among stakeholders to address concerns about privacy, bias, and the preservation of the human element in treatment (Espejo et al., 2023)¹² (Kibibi, 2024).

5.3. Informed consent and autonomy

The complexities of informed consent in the context of AI applications in mental health necessitate a careful examination of how patient autonomy is upheld amid technological advancements. Ensuring that patients fully understand how AI influences their care is crucial for maintaining trust and promoting informed decision-making in psychiatric practice.

6. Comparative Analysis of AI tools

The comparative analysis of AI tools in mental health care reveals significant variations in their effectiveness, usability, and acceptance among clinicians and patients.

6.1. Effectiveness of AI vs. Traditional methods

The effectiveness of AI tools compared to traditional methods in mental health care highlights the potential for enhanced diagnostic accuracy and personalized treatment strategies, ultimately improving patient outcomes.

The integration of AI tools has the potential to significantly enhance diagnostic capabilities and treatment personalization, addressing the critical shortage of mental health professionals globally (Singh et al., 2024).¹³ As these technologies advance, they may reshape the standards of care in psychiatry, improving patient engagement and outcomes. And addressing the pressing need for innovative solutions in psychiatric practice. The ongoing development of AI technologies promises to not only transform diagnostic processes but also enhance therapeutic interventions, ultimately benefiting patient care in profound ways (Espejo et al., 2023) (Kibibi, 2024).

6.2. Patient acceptance and engagement

The acceptance of AI tools by patients is crucial for their successful integration into mental health care, as it directly influences engagement and treatment adherence. To foster patient acceptance, it is essential to prioritize transparency, education, and collaboration between AI systems and mental health professionals, ensuring that technology enhances rather than replaces the therapeutic relationship. Integrating AI tools into mental health care requires a focus on building patient trust and ensuring that these technologies complement the therapeutic relationship rather than undermine it.

7. Challenges and Limitations

The challenges and limitations of integrating AI into mental health care are significant, including concerns over data privacy, algorithmic bias, and the need for human oversight to maintain the therapeutic alliance.

7.1. Technological barriers

Addressing these technological barriers is essential for successful AI integration, requiring investment in infrastructure, training, and ongoing support for mental health professionals to ensure effective adoption and utilization. These barriers can hinder the effective implementation of AI solutions in mental health, necessitating strategic planning and collaboration among stakeholders to ensure successful integration.

7.2. Integration into clinical practice

The successful integration of AI into clinical practice will require addressing these technological barriers while ensuring that ethical considerations remain at the forefront of mental health care delivery. The successful implementation of AI in mental health care necessitates ongoing collaboration between technologists and mental health professionals to ensure that ethical standards are upheld while maximizing patient benefits. This integration process must prioritize training for clinicians on AI tools and their implications, fostering a collaborative environment that enhances patient care and trust.

7.3. Training and education for practitioners

Effective training and education for practitioners is essential to ensure they can confidently utilize AI tools, understand their implications, and maintain the integrity of the therapeutic relationship in mental health care. The ongoing development of training programs focused on AI tools will be crucial for equipping mental health practitioners with the necessary skills to navigate this evolving landscape effectively.

8. Future Directions

The future of AI in mental health care will likely involve continued advancements in technology, with a focus on ethical integration and enhancing the therapeutic alliance between patients and clinicians. The ongoing collaboration between AI developers and mental health professionals will be crucial to address the complexities of ethical integration and ensure that AI enhances rather than detracts from the therapeutic alliance.

8.1. Emerging technologies in AI and mental health

The exploration of emerging technologies in AI and mental health emphasizes the need for innovative approaches that enhance patient care while addressing ethical concerns. As AI continues to evolve, it is crucial to prioritize human

oversight and ensure that technological advancements complement the therapeutic relationship rather than replace it. The ongoing dialogue among stakeholders is essential for fostering a collaborative environment that prioritizes ethical standards while leveraging AI to enhance mental health care delivery and patient outcomes.

The future landscape of mental health care will increasingly rely on AI innovations, necessitating a balanced approach that prioritizes ethical standards and human oversight to maintain the integrity of therapeutic relationships.

8.2. Potential for personalized medicine

The potential for personalized medicine in mental health care is vast, as AI can tailor interventions based on individual patient data and preferences, ultimately enhancing treatment efficacy and patient satisfaction. This potential aligns with the growing emphasis on personalized treatment approaches in mental health, which aim to cater to individual patient needs and preferences while improving overall care quality. The promise of AI in personalized medicine underscores the importance of integrating individual patient preferences into treatment plans, thereby enhancing the overall quality of mental health care.

8.3. Research gaps and unresolved questions

This integration of AI technologies into personalized medicine holds the potential to significantly improve treatment outcomes for individuals with mental health disorders, addressing their unique needs and preferences. The exploration of AI's potential in personalized medicine highlights the importance of addressing ethical considerations while ensuring that interventions align with individual patient preferences and needs.

The ongoing research into AI's role in personalized medicine is crucial for addressing individual patient needs and preferences, ultimately enhancing treatment outcomes in mental health care.

9. Conclusion

The future of AI in mental health care hinges on ethical considerations, ensuring that technological advancements enhance rather than compromise the therapeutic relationship and patient autonomy.

10. Implications for Future Research and Practice

The implications for future research and practice emphasize the need for ongoing evaluation of AI's effectiveness and ethical integration, ensuring that patient-centered care remains at the forefront of mental health innovations. The integration of AI in mental health care presents both opportunities and challenges, necessitating a careful balance between technological advancements and ethical

considerations to ensure effective patient outcomes. The ongoing dialogue among researchers, clinicians, and technologists will be essential for navigating these complexities and ensuring that AI-driven solutions remain aligned with the core values of mental health care. As AI continues to shape the future of mental health care, it is imperative to prioritize ethical standards and patient-centered approaches to ensure that technology serves as an enhancement rather than a replacement for human care.

11. Source of Funding

None.

12. Conflict of Interest

None.

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