



The Role of AI in Improving Mental Health Care

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ABSTRACT

Artificial intelligence (AI) is revolutionizing mental health care by improving access to diagnostic and therapeutic services and offering innovative tools for early intervention. AI's ability to analyze vast amounts of data enables better predictions, treatment recommendations, and enhanced patient outcomes. Despite its potential, the integration of AI in mental health care faces challenges, including ethical concerns, data privacy, and the risk of biased algorithms. This paper investigates the current challenges in traditional mental health care, discusses AI applications, and highlights future opportunities and ethical considerations. The ongoing development of AI holds promise for reducing the treatment gap and enhancing the quality and efficiency of mental health care delivery.

Keywords: Artificial intelligence, mental health care, diagnosis, therapy, AI ethics.

INTRODUCTION

AI is increasingly being integrated into every facet of contemporary existence, bolstering decision-making capabilities and streamlining operations to peak efficiency. It effortlessly operates surreptitiously, harmoniously coexisting with humans, and actively manages interpersonal connections while deftly suggesting optimal courses of action. Within the realm of mental health care, AI systems possess the remarkable potential to elevate the realms of diagnosis, treatment, and prevention of various disorders. While they adeptly automate and amplify therapeutic endeavors for less exigent instances, it is irrefutably imperative that seasoned professionals intervene in cases that necessitate a heightened level of care [1, 2]. The development of more advanced AI and big data solutions is well underway, with the expectation that users' life events will be analyzed in real-time by AI systems augmenting health professionals' decision-making. These innovative AI applications will need to follow regulations and guidelines to ensure acceptable use without any unethical influence. Other concerns may still prevail, such as the unintended consequences of nondeliberate choices made by AI systems, as well as ethical issues, such as transparency regarding the information on which the AI models have been trained. AI systems are based on pattern recognition technologies, and models trained on biased or limited data might lead to either poor results or unfavorable categorization of certain individuals or groups [3, 4].

CURRENT CHALLENGES IN MENTAL HEALTH CARE

Traditional mental health care services have been challenged by different interrelated obstacles. On a supply-side level, the challenge, that arises from traditional mental health care services being expensive, rare, and hard to reach, remains a primary issue. There is no more than one psychiatrist for every 200,000 people in high-income countries and one for every 1,800,000 people in low-income and lower-middle-income countries (non-inclusive of other professionals beyond psychiatrists). Moreover, less than 10% of low- and middle-income countries spend 2% of the already limited health budgets on mental health treatment. Even in high-income countries, there remain unmet demands of over 12 million people for adult mental health services, and in rural areas, estimates exceed a million unmet demands for child psychiatry care [5, 6]. Traditional mental health care services face challenges due to stigmatization and privacy concerns. Many people with mental disorders do not seek treatment, and there are incidents of unauthorized disclosure of mental health information. These breaches can have serious consequences. Online platforms offering high-quality and affordable mental health care services can address these issues.

Additionally, advancements in technology remove restrictions on service provision, allowing for greater accessibility to mental health care services. This aligns with the growing support for IT development in mental healthcare policymaking, as recognized by governments and healthcare organizations worldwide. The integration of technology in mental health care not only improves access but also enhances the overall quality of care provided. Telemedicine, virtual therapy sessions, and mental health apps are becoming increasingly popular, providing individuals with convenient and discreet ways to receive support. Moreover, these platforms offer a wide range of services, including counseling, therapy, and psychiatric evaluations, catering to various mental health needs. The integration of online platforms into mental health care can help bridge the treatment gap by reaching individuals who may have previously been hesitant or unable to seek traditional in-person services. By providing a safe and confidential space for individuals to receive care at their convenience, online mental health platforms have the potential to revolutionize the way mental health care is delivered. As technology continues to advance, it is crucial to prioritize the ethical and secure implementation of these platforms to safeguard patient privacy and ensure the highest standards of care. With ongoing support from policymakers, mental health professionals, and the wider community, online mental health care services can continue to expand, evolve, and transform the field, ultimately improving mental health outcomes for all [7, 8].

APPLICATIONS OF AI IN MENTAL HEALTH CARE

The recent emergence of AI technologies has ignited curiosity regarding their potential roles within health care, particularly in mental health care, which is characterized by a mismatch between needs and available resources. Technologies including chatbots, online screening for severe mental illness, and virtual therapy sessions involving AI-enhanced avatars have entered the field. By offering round-the-clock access, this arsenal of applications aims to connect those in need with professional mental health care, bypassing barriers to care. AI-driven prediction or appraisal of possible therapeutic outcomes and patterns in demographic, diagnostic, and treatment data is currently under development. This approach could enable mental health professionals to make informed treatment decisions and connect patients with evidence-based interventions that have proved effective for similar patients. These applications range from facilitating early diagnosis of mental health conditions using natural language processing or machine learning techniques on social media data to backing mental health professionals' decisions by tracking the effectiveness of treatment in real-time. The implementation of AI in a real clinic has shown widespread provision of patients using non-human technology. Even non-consulted patients ask a chatbot for assistance after having had psychotherapy. If any of these initiatives are integrated within the usual approach to treatment, it would affect how care is provided to individuals in need, supporting mental health professionals in their practice. Specifically, it is proposed that thanks to the AI toolbox, it is possible to better connect patients with the type of intervention they would benefit from, presenting a wide array of possibilities to bridge the current gap in care. One of the nifty aspects of the toolbox is that each of its applications can be developed separately and still contribute to a better approach to mental health care. Nevertheless, the therapeutic interaction is a highly sensitive experience that should still be under human oversight [10, 11].

ETHICAL CONSIDERATIONS IN AI-DRIVEN MENTAL HEALTH CARE

Although the use of artificial intelligence (AI) in mental healthcare has the potential to offer numerous benefits, including improved access, enhanced diagnostics & treatment options, early identification and preventive measures, and greater efficiency and cost-effectiveness, it also raises important ethical and privacy concerns that must be carefully addressed. Some of the issues of concern are data privacy and security; informed consent; transparency; bias and fairness; human oversight; accountability and liability; patient-provider relationships; unintended consequences; and regulation and standards. The amount of sensitive personal health data being collected, shared, and stored is increasing as the amount of personal health data is collected, shared, and stored. Personal health data breaches can have serious consequences, including identity theft, fraud, discrimination, and psychological distress. The quantity and sensitivity of health data is being linked to AI to assess and form powerful tools, potentially intercepted, hacked, or exploited by malicious actors. AI algorithms require patient data to identify models and properly inform the machines making health predictions, designing treatment plans, and assessing patient compliance. The quality of the AI tools heavily depends on the quality and diversity of the data. If the training data is biased, incomplete, or unrepresentative, the AI may produce inaccurate results [13, 14].

FUTURE DIRECTIONS AND OPPORTUNITIES

As socio-cultural and hardware developments currently impact mental health delivery, there are exciting opportunities for the use of advancement in artificial intelligence (AI) related to mental health. Those developments could enhance mental health prevention, diagnosis, treatment, and post-treatment services

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and allow a more comprehensive integration of artificial intelligence in those domains. Those artificial intelligence developments would integrate the amalgam of traditional clinical artificial intelligence systems, e.g. nested teleconsultations or data-driven approaches, and its derivatives based on newer technology (e.g. the Metaverse, driven by augmented reality (AR) and virtual reality (VR)) which could network and store information of treatment and clinical scenarios from heterogeneous AI and human health providers interventions. Such clinical scenarios with collected implicit data and quantification curves could later be “played” to many new patients with the supervision of trained therapists who could intervene only when risk factors arise (e.g. panic crises) or treatment outcomes are unsatisfactory (e.g. high avoidance scores) replicating and exploring those data in unprecedented scales. New hardware developments can help personalize treatments, as those based on VR devices could translate and match stimuli of the great majority of phobias that are activating proximal and distal ancient biological fears transforming those treatments into multi-sensory experiences with more significant impact and efficacy. There are also models of artificial intelligence-based classes of preventive measures with great potential impact on national public health services, that would be networked and support actions of healthcare staff exploring socio-epidemiological and geographical data continuously run in the background of communities’ daily lives. Those models that can be integrated into the great majority of communication devices have no global precedent and are still fundamental for configuring the role of AI in mental health. An exciting and hopeful vision of artificial intelligence in mental health is presented, able to overcome some of the challenges stated earlier and explore already discussed opportunities and new emerging challenges. However, those models could also pose advanced risks, dilemmas and challenges to be considered with great precision at that developmental moment [15, 16].

CONCLUSION

AI has immense potential to address the critical gaps in mental health care by improving diagnostic accuracy, expanding access to therapy, and enabling continuous monitoring of mental health conditions. Its ability to provide data-driven insights and 24/7 support through applications like chatbots and virtual therapy is transforming the landscape of mental health services. However, significant challenges remain, including concerns over data privacy, algorithmic bias, and the ethical implementation of AI. The future of AI in mental health care is promising, but it requires careful oversight, ethical guidelines, and collaboration between technology developers and mental health professionals to ensure responsible integration. As AI continues to evolve, it will play an increasingly important role in complementing human care, ultimately enhancing mental health outcomes on a global scale

REFERENCES

1. Elemento O, Leslie C, Lundin J, Tourassi G. Artificial intelligence in cancer research, diagnosis and therapy. *Nature Reviews Cancer*. 2021 Dec;21(12):747-52.
2. Johnson KB, Wei WQ, Weeraratne D, Frisse ME, Misulis K, Rhee K, Zhao J, Snowdon JL. Precision medicine, AI, and the future of personalized health care. *Clinical and translational science*. 2021 Jan;14(1):86-93. [wiley.com](https://www.wiley.com)
3. Lindberg A. Developing theory through integrating human and machine pattern recognition. *Journal of the Association for Information Systems*. 2020;21(1):7.
4. Zhang C, Lu Y. Study on artificial intelligence: The state of the art and future prospects. *Journal of Industrial Information Integration*. 2021 Sep 1;23:100224.
5. Ortega F, Müller MR. Global mental health and pharmacology: The case of attention deficit and hyperactivity disorders in Brazil. *Frontiers in sociology*. 2020 Sep 29;5:535125.
6. Koirala R. Exploring outcome of trauma in terms of mental illnesses and inflammatory markers in a clinical population in Nepal. 2022. uio.no
7. LaMonica HM, Iorfino F, Lee GY, Piper S, Occhipinti JA, Davenport TA, Cross S, Milton A, Ospina-Pinillos L, Whittle L, Rowe SC. Informing the future of integrated digital and clinical mental health care: synthesis of the outcomes from project synergy. *JMIR mental health*. 2022 Mar 9;9(3):e33060. [jmir.org](https://www.jmir.org)
8. Figueroa CA, Aguilera A. The need for a mental health technology revolution in the COVID-19 pandemic. *Frontiers in Psychiatry*. 2020 Jun 3;11:523.
9. Thakkar A, Gupta A, De Sousa A. Artificial intelligence in positive mental health: a narrative review. *Frontiers in Digital Health*. 2024 Mar 18;6:1280235.
10. D’Alfonso S. AI in mental health. *Current opinion in psychology*. 2020 Dec 1;36:112-7.
11. Boucher EM, Harake NR, Ward HE, Stoeckl SE, Vargas J, Minkel J, Parks AC, Zilca R. Artificially intelligent chatbots in digital mental health interventions: a review. *Expert Review of Medical Devices*. 2021 Dec 3;18(sup1):37-49. [tandfonline.com](https://www.tandfonline.com)

<https://rijournals.com/public-health-and-pharmacy/>

12. Alhuwaydi AM. Exploring the Role of Artificial Intelligence in Mental Healthcare: Current Trends and Future Directions—A Narrative Review for a Comprehensive Insight. *Risk Management and Healthcare Policy*. 2024 Dec 31:1339-48.
13. Whang SE, Roh Y, Song H, Lee JG. Data collection and quality challenges in deep learning: A data-centric ai perspective. *The VLDB Journal*. 2023 Jul;32(4):791-813.
14. Liang W, Tadesse GA, Ho D, Fei-Fei L, Zaharia M, Zhang C, Zou J. Advances, challenges and opportunities in creating data for trustworthy AI. *Nature Machine Intelligence*. 2022 Aug;4(8):669-77.
15. Lee EE, Torous J, De Choudhury M, Depp CA, Graham SA, Kim HC, Paulus MP, Krystal JH, Jeste DV. Artificial intelligence for mental health care: clinical applications, barriers, facilitators, and artificial wisdom. *Biological Psychiatry: Cognitive Neuroscience and Neuroimaging*. 2021 Sep 1;6(9):856-64. nih.gov
16. Dawoodbhoy FM, Delaney J, Cecula P, Yu J, Peacock I, Tan J, Cox B. AI in patient flow: applications of artificial intelligence to improve patient flow in NHS acute mental health inpatient units. *Heliyon*. 2021 May 1;7(5).

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