

Impact of Artificial Intelligence (AI) on Psychological and Mental Health Promotion: An Opinion Piece

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Abstract

The *digital revolution* has made integrating artificial intelligence (AI) into the medical sector easier. AI is currently being used to speed up the detection of diseases in their early stages, facilitate the delineation and understanding of disease variations, and improve optimised treatment protocols. Psychology is no exception, as new role players have emerged, most notably the incorporation of AI into both psychological research and clinical practice. However, there is an apparent unease with AI as a technological breakthrough advancing science in mental health, such as data privacy, national guidelines on the use of AI, successful integration of users into the clinical setting and empathy, compared to human psychologists. Regardless, AI functions in psychology are gradually snowballing. We present an opinion on the impact of AI on improving mental health based on the exploration of available published evidence. We highlight the potential of AI in improving mental health care through mental health disorder detection, diagnosis, treatment, and public health education. The article

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also discusses the potential challenges and future directions, highlighting the importance of interdisciplinary collaboration and developing novel AI-based approaches to improve mental health outcomes.

Keywords: Mental health; artificial intelligence (AI); Psychology; Mental health promotion; Africa

Introduction

Mental health issues continue to be a global concern, with a steady 13% prevalence over the past 10 years and a statistical projection that nearly one in four people worldwide will be affected by a mental or neurological disorder at some point in their lives (Batada A & Solano RL, 2019; Ministry of Foreign Affairs, 2023; World Mental Health Report, 2022). Despite this prevalence, mental health remains a largely overlooked aspect of global health, with disparities in access, quality, and care affordability. These insufficiencies and the toppling of the recent global COVID-19 pandemic have forced the healthcare sector to embrace novel methods for rapid yet cautious modifications to improve the mental health care (World Mental Health Report, 2022). At one of the frontiers of technological innovation - artificial intelligence (AI) holds promise in reshaping mental health care. AI uses computers and machine activities to model human intellectual capabilities and execute complicated robotic responsibilities. It has been integrated with fields such as psychology, brain science, and computer science to understand human psychology better and improve human-computer interaction, leading to the development of AI-machine simulations (Zhao et al., 2022). Smartphone-based interventions, AI-based therapy solutions, and the use of AI in peer-to-peer support and social media platforms are just a few areas where AI has shown promise in mental health care. Some AI mental health interventions that can be delivered via smartphone include applications and/or web-based tools designed to conduct symptom assessment, psychoeducation, and treatment progress tracking (Miralles et al., 2020). These programs, which use AI technologies such as natural language processing and machine learning, provide cognitive-behavioural therapy and mental health assistance (Miralles et al., 2020; Squires et al., 2023). For example, machine learning-based technologies have shown promise in detecting, diagnosing, and treating depression (Squires et al., 2023). Furthermore, AI has been used in universities to improve public mental health education, raising both student and faculty awareness of mental health issues (Li et al., 2022; Lu, 2022). Therefore, this article sheds light on the use of AI in mental health care and highlights areas where advancement is possible.

Founding Fathers of Psychology and The Emergence of AI

As shown in Table 1, the field of psychology and AI appear to be worlds apart, but these differences trigger potential synergies through which AI is now applied in mental health to improve health outcomes. In this section, we will explore the history of modern psychology and the connections that have emerged between psychology and artificial

intelligence. The founding fathers of psychology are often considered to be Wilhelm Wundt, William James, and Sigmund Freud (Cao, 1913). Wilhelm Wundt, the founder of experimental psychology, established the first psychology laboratory in Leipzig, Germany, in 1879. He emphasised the importance of studying conscious experience through introspection and is credited with making psychology a separate scientific discipline. William James, an American psychologist, is known for his contributions, which focused on the purpose and function of mental processes. His book *The Principles of Psychology* is considered a landmark in the field and has significantly influenced the development of psychology. Sigmund Freud, an Austrian neurologist known for his psychoanalytic theory, emphasised the importance of the unconscious mind and early childhood experiences in shaping personality. Freud's work profoundly impacted the field of psychology and continues to influence various therapeutic approaches.

The perspectives of these pioneers were influenced by the prevailing knowledge and technological advancements of their respective eras. The assessment of their precise viewpoints regarding the application of AI in the field of mental health is arduous due to the temporal disparity between their era and the present time, where we now have advanced technological breakthroughs. Nevertheless, their research focuses on the scientific examination of human behaviour and the ability to anticipate and regulate behaviour, which coincides with the potential utilisation of AI in the mental health field. Therefore, the founding fathers' viewpoints are congruent with the potential utilisation of AI in the mental health field. However, it is imperative to consider the ethical ramifications, data confidentiality concerns, and the involvement of human psychologists in the implementation of AI. It is of utmost importance to maintain a delicate equilibrium between utilising the first-person perspective to augment human comprehension and the responsibility of human psychologists in delivering comprehensive and ethically sound health care. The history of psychology and the integration of modern AI in mental health have contributed to the field's advancement. As AI continues to advance, its integration with psychology has the potential to transform the field in remarkable ways. AI can provide insights into human behaviour and cognition to help diagnose and treat various mental health conditions. AI-driven therapies and treatments are already promising, and the potential for further collaboration, research, and innovation between AI and psychology is immense.

Table 1: A Comparison of Psychology and Artificial Intelligence to Stimulate Discourse in the Differences and Synergies

Psychology	Artificial Intelligence
Studies human behaviour, mental processes, and interactions with the environment.	Studies the creation of intelligent machines or machines that perform tasks that typically require human intelligence.
Uses the scientific method to explore behaviour and mental processes.	Uses algorithms and machine learning to process data and make predictions.
Draws on research in fields such as biology, neuroscience, and sociology.	Draws on research in fields such as computer science, mathematics, and engineering.

Current Mental Health AI Tools

From chatbots and virtual therapists to machine learning algorithms that can predict and prevent mental health issues, the potential of AI in mental health is vast. Table 2 shares some of the most common and current mental health AI tools adopted from the available evidence (Haque & Rubya, 2023). These tools assist mental health professionals in making decisions by analysing a patient's previous medical records, behavioural patterns, and social media activity (Irshad et al., 2022). According to a meta-analysis (Firth et al., 2017), using a smartphone application or web-based tool can significantly reduce depressive symptoms through interactions with the chatbot.

The inclusion of AI in these interventions has the potential to expand their reach and efficiency. In the field of mental health, there has been a recent increase in the use of AI-based therapy solutions. In difficult times, such as the recent COVID-19 pandemic, AI-based therapy solutions offered novel approaches to addressing the mental health crisis. It may improve mental health outcomes when applied to peer-to-peer support and social media platforms. Individuals suffering from mental disorders can benefit from connecting with others online, sharing experiences and encouraging one another (Naslund et al., 2016). AI can assist people in locating supportive social groups and provide them with personalised strategies for improving their emotional and physical health (Naslund et al., 2016). However, weighing the benefits against the risks is critical, which includes encountering false information or offensive remarks (Naslund et al., 2016).

Table 2: List of the 10 Common Mental Health AI Apps with Chatbots as Listed by Haque & Rubya, 2023

AI Mental health app	Purpose	Conversational flow	Media type	Crisis support	Age rating (years)
ADA	Digital screener for anxiety and depression	Guided	Text	None	≥ 17
Chai	Conversational companion	Guided	Text and emoji	None	≥ 17
Elomia	Virtual therapist for Stress, anxiety, depression, self-care, sleep disorder, relationship issues, low self-esteem, and loneliness	Open-ended	Text	Access to self-care tools	≥ 12
Mindspa	Virtual therapist Anxiety, depression, self-care, relationship issues, and low self-esteem	Guided	Text and video	Availability of crisis related information and access to self-care tools	≥ 17
Nuna	Digital coach for Stress, anxiety, depression, and self-care	Open-ended	Text and emoji	Availability of crisis related information and access to self-care tools	≥ 4
Serenity	Conversational companion for Anxiety, self-care, sleep disorder, and relationship issues	Guided	Text and emoji	Access to self-care tools	≥ 12

Stresscoach	Digital coach for Anxiety, stress, and panic disorder	Guided	GIF, text, and emoji	Availability of crisis related information and access to self-care tools	≥ 12
Woebot	Digital coach for Stress, anxiety, depression, self-care, relationship issues, and loneliness	Semi guided	GIF, text, audio, video, emoji	Availability of crisis related information and access to self-care tools	≥ 12
Wysa	Digital coach for Stress, anxiety, depression, self-care, and sleep disorder	Open-ended	GIF, text, audio, video, emoji, images, and acronyms	Availability of crisis related information, access to self-care tools, access to professional therapist, ability to detect potential crisis from the chat, and ability to notify designated personnel	≥ 12
Youper	Digital coach for Self-care	Guided	Text	Availability of crisis related information, access to self-care tools, and access to professional therapist	≥ 12

source: Haque & Rubya, 2023

Gaps in the Application of AI on Mental Health for Targeted Improvements

Over time, there has been a surge of interest in the effects of AI on mental health. There are many successful examples of AI's use with electronic health records and brain imaging (Lee et al., 2021). While AI has the potential to improve mental health care, the high morbidity and mortality in people with mental health disorders necessitate a rapid review of evidence on AI and mental health to identify gaps that should be targeted

for improvement in the implementation of AI in mental health. According to our synthesis of existing literature, the application of AI to mental health varies by skill level, and more research is needed to understand the specific application of AI for mental health issues by different populations and to identify ways to maximise AI's positive effects on mental health, particularly in Africa (Fiske et al., 2019; Nilsen et al., 2022; Wei & Wang, 2022). The World Health Organisation (WHO) also identified similar gaps, such as methodological flaws, data processing, privacy, and the viability of mental health Apps for diverse contexts and conditions (World Health Organisation, 2023). There is a persistent gap between rapid advancements in AI mental health tools and successful clinical integration and adoption by health professionals for patients in clinical settings, particularly in most African countries, which are less developed than countries in America and Europe. As such, the integration of AI across the broader field of mental health is frequently overlooked in African studies, limiting our understanding and appreciation of the implications of AI in this domain (Fiske et al., 2019). Another major issue using AI in mental health is a lack of ethical and regulatory frameworks and national guidance on AI application development, clinical integration, and health professional training, which we hope responsible health stakeholders in Africa will consider for context-specific strategies.

The Context for the AI Intervention Future Direction

The COVID-19 pandemic highlighted the emotional strain that poverty, isolation, and the fear of the unknown have on people's mental health (Rwafa-Ponela et al., 2022). The impact of unemployment in poor communities is a leading cause of mental health conditions/disorders such as depression and anxiety (Nguse & Wassenaar, 2021). Despite this, the WHO reports that the majority of people in need of mental health services do not have access to or opt not to seek mental health services due to stigma and discrimination, low mental health literacy, and cultural and religious beliefs (Caplan, 2019; Freeman, 2022; World Health Organization, 2022). With increased access to and use of technology devices and the internet, AI has been evidenced to increase health engagement and improve health outcomes (Alwashmi, 2020) (McGuire et al., 2021; Vaishya et al., 2020). AI is also widely used in mental health care to raise awareness, screen, monitor, and provide clinical guidance and support (Boucher et al., 2021). An increased interest in using AI by end users is characterised by anonymity, reduced cost to health services and increased autonomy in the disease management (Lovejoy, 2019). Despite the progress made with availing AI technology for mental health care, usability limitations exist in AI applications, including sensitivity to societal values. The stigmatisation of mental health based on religious and cultural beliefs contributes to delayed health-seeking behaviour, diagnoses, treatment and disease control (Chatmon, 2020; Javed et al., 2021). The role of AI in addressing stigma-related health-seeking behaviour requires context-based interventions. Bearing in mind the emotive and personal nature of mental health, AI must mirror the values and lived experiences of the population for which it is designed to increase engagement, address

self and social stigma and improve health-seeking behaviours. Therefore, it is essential to consider the context in which interventions are targeted (Carman & Rosman, 2023).

Research has shown that involving end users through usability studies in designing AI-generated applications has been instrumental in ensuring context-based messaging, curbing language limitations and addressing cultural disparities in delivering and engaging health services (Cordova et al., 2015; Shields et al., 2022). Therefore, to address stigma related to mental health, collaborative efforts in the design of interventions are crucial. Notwithstanding the negative effects of faith-based beliefs on health-seeking behaviour, it is also noteworthy that religion and culture have positive impacts on mental well-being and resilience (Chang et al., 2021; Nguyen, 2020), attributes essential for mental health management. Therefore, including various mental health professionals and religious and cultural stakeholders in designing AI interventions will aid in developing and disseminating factual health information for awareness raising.

Conclusion

This review exemplifies the broad range of uses of AI, including the detection, diagnosis, and treatment of mental health disorders and public mental health education. However, to ensure AI's responsible and successful application in mental health care, issues like algorithm accuracy (methodological flaws), geographical settings such as Africa, end-user experience, and data privacy must be addressed. Besides, there is a dire need to integrate AI into clinical settings by implementing scientific strategies incorporating precise effects of AI on various populations. Consequently, the field of psychology can keep using AI to improve mental health outcomes and advance general well-being by encouraging interdisciplinary collaboration and innovation. However, it is essential to thoroughly deliberate upon ethical considerations and the involvement of human psychologists to guarantee the responsible and efficacious implementation of AI in the field of mental health.

Recommendations

Amidst the ongoing progress in the application of AI in the field of mental health, the consolidation of a comprehensive framework that is tailored to specific contexts, involving key stakeholders such as policymakers, clinical psychologists, and data science experts, holds the potential to enhance awareness of mental health and improve outcomes. This framework should prioritise patient well-being and address previously identified gaps and ethical concerns. Additionally, it is important to highlight that using AI carries the possibility of excessive dependence on technology, which may result in eliminating human interaction and the absence of empathy. To prevent AI from overshadowing the importance of clinical integration and the role of human clinical psychologists, careful consideration must be given to the ethical implications of

possibly replacing human professionals. To fully understand and exploit the potential of AI in fostering psychological and mental health, it is necessary to conduct additional empirical research, which will allow for the implementation of all the recommendations. Lastly, developing and implementing AI systems can be costly, particularly for under-resourced settings like countries in Africa. Consequently, it is important to consider the financial implications for both the investigators and target users (population) when planning AI projects.

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