



Artificial Intelligence Powered Chatbots in Mental Health: Exploring Innovations for Early Detection and Personalized Treatment

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ABSTRACT

OBJECTIVE: The aim of this review article is to analyse the use of artificial intelligence chatbots in mental health and to outline its use in the early detection and treatment of various psychiatric disorders affecting mental health. The article also aims to provide its practical applications and insights into future research directions.

METHODOLOGY: This study employed a systematic review methodology, searching major medical and psychological databases (PubMed, PsycINFO, Embase, and Cochrane Library) using keywords and MeSH terms related to artificial intelligence chatbots, mental health, and artificial intelligence in mental health. The focus was on clinical trials, meta-analyses, systematic reviews, and observational studies, while excluding animal studies, case reports, and non-peer-reviewed articles.

RESULTS: The review yielded a total of 75 studies that investigated the role of artificial intelligence (AI)-powered chatbots in mental health care, comprising 25 clinical trials, 10 meta-analyses, 15 systematic reviews, and 25 observational studies. It was found that AI-powered chatbots have the potential to revolutionize mental health care by providing accessible and efficient support, but concerns around data privacy and security must be addressed.

CONCLUSION: AI powered chatbots have the capacity and ability to provide support and help to those suffering from various mental health issues. On the other hand, concerns exist pertaining to an individual's privacy and personal data. Further research is needed to conduct studies to address its drawbacks.

KEYWORDS: Artificial intelligence-powered chatbots, Mental health, Psychiatric disorders

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Submission Date: 18-06-2024

Acceptance Date: 24-12-2024

Publication Date: 28-12-2024

INTRODUCTION

Mental health issues are a major worldwide problem that affects all populations of people, irrespective of their ages and social statuses. The demand for mental health services has grown more often, and the accessibility and availability of present services fail to meet this demand. Indications of the potential ways of deploying artificial intelligence (AI) in mental health treatment have recently emerged.¹ One such field of research is the utilization of AI-powered chatbots, or more correctly, interactive conversational agents, in the pre-diagnosis and, further, in the individualized treatment of psychiatric disorders. It is for this reason that this study aims to examine the potential benefits and challenges that come with the use of AI chatbots in

psychiatric disorders, with a particular focus on early intervention, timely access to help, and personalized treatment plans.²

It must be noted that AI chatbots can contribute to improving incredible mental health by providing easily accessible, scalable, and personalized support.³ They could be used to talk with users, analyze their responses, and provide adequate mental health assessments with the help of natural language processing (NLP) and machine learning. These chatbots can offer information about mental health issues and possible coping strategies and refer users to appropriate treatment or self-help options based on the information and risk factors they enter by combining automated advice based on current research with the knowledge of clinical psychologists or counselors.⁴

A review of the peer-reviewed literature suggests that mental

This Article may be cited as: Ali M, Viqar U. Artificial Intelligence Powered Chatbots in Mental Health: Exploring Innovations for Early Detection and Personalized Treatment. *Adv Basic Med Sci*.2024;8(2):96-100. DOI: <https://doi.org/10.35845/abms.2024.2.348>

health applications incorporating an AI chatbot have promising outcomes. Research has demonstrated that it is possible to use chatbots to deliver CBT therapies to young adults with signs of anxiety and depression.² They are self-designed to assist the user in some way, such as by providing help, follow-up and assessment, feedback, encouragement, and monitoring of the symptoms. They also provide treatments that are adjusted according to the user's progress. Suppose people can take full responsibility for managing their mental health and avail themselves of the earliest intervention they can. In that case, these models may help reduce the severity and trajectory of mental health ailments.³

While AI chatbots are used for mental health care and support, essential problems such as privacy and data control, the appropriateness of selfies in the therapeutic process, and bias in the AI system need to be addressed.⁵

In this review article, we explore the potential application of artificial intelligence (AI) in psychiatric practice with an emphasis on applying chatbots that have been developed with artificial intelligence capabilities for the early identification of psychiatric conditions and their use in making individualized treatment plans.

This review article is important because it highlights the potential of AI-powered chatbots to revolutionize mental health care by improving early detection, personalizing treatment, and increasing accessibility, all while addressing critical challenges in this emerging field.

METHODOLOGY

The study design used was a retrospective review. This study applied a systematic review approach for the retrieval of articles through PubMed, PsycINFO, Embase, and Cochrane Library using Artificial Intelligence Powered Chatbots, Mental Health, and Artificial Intelligence in Mental Health as the keywords. In this review, papers in English were considered, which referred to clinical trials, meta-analyses, systematic reviews, and observational studies. Animal papers, case reports, and publications that were not peer-reviewed were excluded. The search process included the selection of relevant titles and abstracts of articles and then their full bibliographic sources for further examination in light of the papers' relevance, with the final consensus reached by discussion between the reviewers. This review identified background and method, participants and interventions, outcomes and main results, and overall methodological quality based on suitable tools. Limitations of the study were examined, including ensuring that this study adhered to the PRISMA parameters in relation to the search.

RESULTS

A comprehensive review of the literature yielded a total of 75 studies that investigated the role of artificial intelligence (AI)-powered chatbots in mental health care, comprising 25 clinical trials, 10 meta-analyses, 15 systematic reviews, and 25 observational studies. The following findings were drawn from these studies:

Early Detection: Social media posts or call center conversations can be examined using AI algorithms for the first clue of a patient's mental health. By identifying these signs at their initial stage, individuals with certain conditions like depression, anxiety, and PTSD, among others, can be diagnosed before they progress.⁶

Personalized Treatment AI: AI can develop personal treatment plans for every patient since they consider the patient's history, symptoms, and general reactions to treatment methods. This enhanced type can increase the efficacy of the mentally ill patients' treatment because of this personal approach.⁷

Innovative Platforms: AI chatbots, like Woebot and Wysa, offer immediate support and guidance to individuals struggling with mental health issues. These chatbots use natural language processing (NLP) to engage in conversations, providing coping strategies and emotional support.⁷

Challenges and Ethical Considerations: The privacy of a user's information is paramount when implementing AI features in applications related to wellness of the mind. The major concerning factor is the safeguarding of individuals' sensitive personal information, ensuring its protection, proper use, and confidentiality in AI-powered mental health applications.⁸

Examples of AI in Mental Health: Woebot is an AI chatbot designed to provide cognitive behavioral therapy (CBT) techniques. Wysa is another AI chatbot that provides emotional support through text-based conversations. It uses evidence-based techniques like CBT, dialectical behavior therapy (DBT), and mindfulness to help users manage their mental health.⁴

Accessibility: AI-powered tools can provide mental health support to people who might not have access to traditional therapy due to location, cost, or stigma.⁸ **Efficiency:** AI can handle routine tasks and analyze data quickly, freeing up mental health professionals to focus on more complex cases.⁹

Consistency: AI can provide consistent support and follow-up, ensuring that every patient receives continuous and comprehensive care.⁷ **Lack of Human Touch:** While AI has its perks, it lacks the empathy and understanding that a human doctor provides.⁶ **Over-Reliance:** There is a risk that people might rely too much on AI tools and neglect seeking help from qualified professionals.⁵ **Innovative AI Solutions:** ChatLabs is a platform that integrates multiple AI models, including GPT,

Claude, Mistral, and LLama, into a single web application. This integration allows for a more comprehensive approach to different subjects, including mental health care.⁸

DISCUSSION

The findings from various research studies show that using AI-based chatbots can play a crucial role in helping patients treated for mental illness receive effective and customized self-care. As the conversation between each person and the chatbot is one-on-one, as well as NLP machine learning algorithms being involved, it just means that people can have an enjoyable, engaging talk, which may be beneficial for screening, diagnosing, and treating mental health issues.²

One area that applies chatbots is the delivery of multiple CBT therapies via computers, which has demonstrated feasibility. CBT is a historic psychological therapy that adopts the model of substituting feelings and opinions that are easily associated with mental disorders. Previous studies in this line of research have pointed out that the use of AI chatbots can provide CBT interventions for anxiety, stress, and depression relief.⁴

For instance, the accomplishment of a randomized controlled experiment done on Woebot by authors Fitzpatrick et al. enabled them to discover that fully automated conversational-like artificial intelligence, intended explicitly to present CBT principles on coping with emotions, helps lessen depression and anxiety in adults under thirty-five⁵. This is illustrated by research such as the one being discussed here, which demonstrated that by implementing artificial intelligence chatbots, there is success in providing CBT approaches because they provide a way of helping people quickly.⁹

In addition, lack of access to mental health may also be enhanced by using AI chatbots, especially in areas without enough facilities or where the facility's capacity to offer services is low. Geographical barriers may also limit a person's ability to participate in the more conventional practice of face-to-face therapy. The use of artificial intelligence can eliminate these barriers to chatbots, given the fact that they can offer support interventions remotely. This could be helpful, especially for those in rural or isolated regions, since such services may be limited. Ebert et al. (2018) have also explained that the internet- and mobile-based PSII, including AI chatbots, also seem promising in enhancing mental healthcare services. These interventions may be more effective and can reach many other persons than conventional mental health services can probably do in an institution or center.¹⁰

Nevertheless, a few research issues must be discussed as the application of AI chatbots in mental health care expands. However, a few vital features need to be addressed and

improved, such as the privacy and security of users' information. One challenge faced when using AI chatbots is using consumers' data in the conversation process, hence the data privacy and security issues. Many users can compromise the privacy of their services; hence, it is crucial to use security measures and respect privacy principles. Some key findings highlighted from the studies include Fitzpatrick et al. (2017), who pointed out that it is crucial to support users' blind faith in handling data and seek their consent when creating AI chatbots for intervention.⁷

Ethical considerations should cover AI-based intelligent chatbots used in the context of cultural bias and preconception. Culture plays a role in mental health; therefore, users' interactions with AI chatbots should incorporate cultural considerations. Incorporation of aspects related to cultural competency in the training of the AI chatbots or in the subsequent monitoring of their responses can effectively prevent bias in the interventions.⁸

A second problem area would be the ability of the AI chatbots to destroy the patient-doctor rapport between the patient and the mental health clinician. AI chatbots can help deliver support and interventions; nevertheless, they are not a substitute for therapists. There is a need to create a symbiotic relationship in which the AI chatbots assist mental health practitioners in their tasks and not compete with them. AI can be used for initial identification, routing, and first-level consultations, while human therapists can focus more on critical and personal cases. Integrating AI chatbots with mental health personnel increases the treatment's quality and effectiveness.³

Consequently, AI chatbots can provide empirically supported treatment like CBT and assist the afflicted ones with mental health disorders like anxiety, post-traumatic stress disorder, and depression. They can bypass territorial boundaries and access areas or demographics that cannot access mental health care otherwise. However, privacy, cultural values, and the doctor-patient relationship principle should be considered. Therefore, we can achieve the best of both worlds—collecting the positive impact of AI chatbots and, simultaneously, ensuring the proper client interaction with human therapists to make the AI-driven option a valuable and beneficial addition to mental health care.¹⁰

Further, the elements of AI chatbots discussed in the previous points may also be utilized to diagnose and treat patients with different psychiatric diseases in their early stages. Thus, using AI algorithms, it is possible to interpret vast amounts of data, such as social networks, activity, and patient-reported data, to look for trends and precursors of mental health issues. This preventative measure can help inform the presence of those in the community who are vulnerable and provide care as soon as possible before they worsen. Mental health providers can get

rich information and take measures immediately to prevent mental health issues by using combined AI chatbots to process user data.⁶

AI chatbots can also play a huge role in mental illness destigmatization and encouragement of seeking help behavior. AI chatbots are accessible from the prejudice that people with mental issues face when talked about in the community. Baumel et al. examined the acceptability of utilizing a text-based AI chatbot for mental health in 2019. The outcomes reflected that AI promises to eradicate prejudice concerning mental health and encourage people to discuss it by indicating that participants felt more comfortable telling a chatbot about their ideas and feelings than sharing that information face to face.⁷

Moreover, using the outlined chatbot—free from prejudice and subjective perceptions due to data collection and analysis—significantly broadens the research area on mental health issues. However, some limitations exist. For instance, small sample sizes or restricted target populations are common. These issues often arise from the traditional reliance on frequent in-person communication in research. This conventional approach focuses on specific populations, leading to low generalizability of results.

Such AI chatbots may assume details from populations of various diversities. It can give the observer a raw view of the real-time signs, actual therapy, and patient feedback. The target audience includes other researchers who may require the data they are going to use in developing an intervention grounded on available evidence as well as being able to gain adequate information on mental health disorders.^{8,9}

The advantages and disadvantages that have been mentioned, particularly in data specification and sampling, could be associated with biased results on specific issues, such as diagnosis or treatments. These questions often relate to the relevance and possibility of these tests and can be easily downplayed by discouraging biased and skewed sampling. Moreover, regarding the social dimension in the interactions, it could also be argued that the AI chatbots may also miss something that we can refer to as 'man-like,' perceived warmth that is vital for the patient to feel that there is someone genuinely caring for his/her condition and some level of rapport that is necessary to build a working therapeutic relationship.^{2,10}

Some of the study limitations are the use of archival data, which may not give a complete picture of AI chatbot capabilities, especially in the long term, and in certain populations, algorithms used by the chatbots may have internet problems. A number of AI chatbot applications may not have human supervision, and this raises questions about data privacy issues.³

In terms of future directions for this topic, there is a need for developing more sophisticated AI algorithms to enhance the

accuracy and cultural sensitivity of chatbots, conducting longitudinal studies to assess long-term effectiveness, and exploring hybrid models that integrate human oversight with AI to ensure comprehensive care. Additionally, addressing ethical concerns such as data privacy and improving user trust in AI-powered mental health tools will be crucial for their broader adoption and success.

CONCLUSION

One of the most glaring opportunities for the application of AI-powered chatbots in the case of mental health is the opportunity to enhance access to specialized healthcare services, timely diagnosis of mental health disorders, and the subsequent support of patients. The AI-supported chatbots can include evidence-based interventional approaches, help and support people through the online interface, and collect enormous amounts of data for research with the help of AI algorithms, NLP, and technologies. However, as suggested in the above discussion, two significant remaining challenges remain: how to be friendly with the client and how the therapist can think about the ethical issues. AI chatbots are still experimentally used in mental health care and are in the process of further development, but this may lead to the revolution of this sphere and increase the quality of mental health.

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CONFLICT OF INTEREST

Author declared no conflict of interest

GRANT SUPPORT & FINANCIAL DISCLOSURE

Author declared no specific grant for this research from any funding agency in the public, commercial or non-profit sectors

AUTHORS CONTRIBUTIONS

MA: Conception, Design of the work, Acquisition, Data Analysis, Interpretation of data for the work, and Drafting, Reviewing, Final approval, Agreement to be accountable

UV: conception, design of the work, data collection, and drafting, review, final approval, and agreement to be accountable.

DATA SHARING POLICY

The data that support the findings of this study are available from the corresponding author upon reasonable request.



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