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The Influence of AI-Powered Chatbots on Reducing Mental Health Care Barriers in Rural Areas

Muhammad Asim
Department of Eastern Medicine, Faculty of Medicine and Allied Health Sciences, The Islamia University of Bahawalpur, Pakistan (Coresponder)
Email: asim32988@gmail.com

Hoor Fatima Yousaf
Bahria University Lahore Campus, Lahore, Pakistan
Email: hoorfatima.bulc@bahria.edu.pk

Usama Nasir
University of Central Punjab, Lahore, Pakistan Email: usama.nasir@ucp.edu.pk

Muhammad Abubakar Farooq
Department of Information Technology, Bahria University Lahore Campus
Lahore, Pakistan Email: abubakarfarooq123@gmail.com

Faraya Yousaf
Department of Physiotherapy, University of Lahore, Lahore, Pakistan
Email: faryayousaf@gmail.com

Abstract
Lack of staff, stigma, financial barriers, and remote locations often impede access to mental health services in rural areas. A potential remedy to these barriers is AI-powered chatbots, which provide scalable, affordable, and accessible mental health support. This study examines how AI-powered chatbots can improve access to rural mental health services and outcomes. AI chatbots fill gaps in mental health services that may be lacking in traditional care. Providing personalized service, reducing stigma, and providing 24-hour support, rural participants said they felt more buy-in to using AI chatbots to access mental health services and visits. Convenience and privacy are the key factors they consider. Additionally, because chatbots are accessible and scalable. Therefore, it is an effective alternative to traditional medicine. This is especially true in areas where there is no mental health infrastructure. However, the research also focuses on ethical issues. It also entails human care, which ensures effective treatment. And two dice. Resulting in better mental health in the rural areas.

Introduction

Mental health disorders are a significant problem worldwide. It affects millions of people in all walks of life. According to the World Health Organization (WHO), approximately one in eight people worldwide suffer from mental health problems. Although these symptoms are widespread access to appropriate care remains a fundamental problem. Studies indicate that most people with mental health problems do not receive adequate treatment. This is due to several challenges. This includes a scarcity of resources, stigma, and limited access to

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appropriate professionals. These are pronounced in rural areas. The cultural stigma of infrastructure along with economic constraints limits access. This makes the task of accessing mental health care even more challenging(1, 2).

Rural regions around the world face severe mental health care shortages. Due to the distance between the two medical facilities, individuals often have to travel long distances to seek help. According to the American National Rural Health Association (NRHA), approximately 65% of rural counties do not have access to a single psychiatrist, psychologist, or social worker. This statistic reflects only one aspect of the problem: Global inequalities in mental health care resources are even deeper in low- and middle-income countries. Rural populations face enormous structural and economic challenges.(3).

In addition to geographic isolation Cultural factors also play a role in the treatment gap. Mental health stigma that is deeply rooted within many rural communities prevents those in these areas from freely speaking about mental health-related problems or seeking help for them. There is much vagueness in many of these areas regarding whether problems associated with mental health are linked to moral weakness or moral failure. This shame fosters silence and denial. Consequently, many Dor sufferers go untreated. As with access to other health-promotion quaisquer methods possums may employ to save, the literacy of rural mental health, or its awareness and understanding of symptoms, causes, and treatments tends to decline without them. The complexities of the efforts to close this gap include(4, 5).

The economic factors exacerbate the difficulties that rural people face. Most people in these areas have lower incomes and also poor health insurance. Added to the high cost of mental health care, This includes therapy, medication, and transportation to far-off clinics. These factors make professional mental health care inconvenient for a significant proportion of the population. These multiple barriers highlight the need for innovative, accessible solutions that are very urgent. Provide mental health services to underserved regions(6).

Artificial intelligence (AI)-empowered technologies bring about transformational opportunities to overcome all these challenges. AI has revolutionized several realms such as health care, education, and customer care. In this respect also, it can well be argued that an AI-based chatbot promises a lot concerning the realm of psychological health. A chatbot is indeed a conversational agent used for communication with humans, either in the form of text or voice, but more and more nowadays in providing mental health support or resources or even therapy intervention(7).

The latest algorithms in machine learning and natural language processing form the basis of AI chatbots in mental health care. They are designed to speak with users conversationally, and they offer a wide variety of services, from emotional support to evidence-based therapeutic techniques and resources, while they help manage crises. The fact that these chatbots implement user-centric design principles ensures real-time personalization, easier scaling, and decreased costs. This makes them the ideal solution for regions where conventional mental health services may be limited or unavailable completely(7).

The application of AI-powered chatbots in mental health care is multi-dimensional. AI-powered chatbots, such as Woebot, Wysa, and Replika, can be applied to engage users in a conversation based on empathy. It can be applied to

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reduce stress, anxiety, and depression by providing reassurance and by understanding continuous available talks. Most of the chatbots are specifically devised for evidence-based therapies, including CBT(8). These chatbots engage with users in structured conversations to help them recognize, hence challenge negative thought patterns, and learn new coping mechanisms. They frequently offer educational content on mental health-related issues, including coping strategies and self-help methods, and may even direct users locally to mental health services. Some AI chatbots are created to detect severe emotional distress or suicidal intent. In such cases, these chatbots can easily connect users to emergency services or human counselors for immediate action(9).

Aspect	Details	References
Mental Health Challenges	Stigma, isolation, workforce shortages, and affordability in rural areas.	(10)
Role of AI Chatbots	Provide emotional support, therapeutic interventions, resources, and crisis management.	(11)
Geographic Barriers	Chatbots offer support without travel, reaching remote areas.	(9)
Reducing Stigma	Anonymity helps reduce the stigma, encouraging people to seek help.	(9)
Affordability & Scalability	Cost-effective, scalable, and available 24/7, addressing economic and workforce barriers	(7)

Table 1:Key Aspects of AI-Powered Chatbots in Addressing Mental Health Care Barriers in Rural Areas

These capabilities enable AI-powered chatbots to overcome prominent barriers to mental health services in rural areas. There is one of the significant benefits of AI-powered chatbots: they can breach the barrier of geographic isolation. Since these chatbots exist through smartphones, tablets, or computers, individuals cannot stay in remote or service-poor areas and face travel-related barriers to the attainment of mental health. This is particularly crucial in places where transport infrastructure is not strong or environmental factors such as difficult weather conditions make it tough to visit clinics in person(11).

AI chatbots offer a virtual first contact with people dealing with mental health issues. They provide timely intervention and immediate responses, which might be necessary in curbing the development of mental health disorders. In the end, when professional care becomes necessary, chatbots help users seek additional support to ensure people are properly linked to relevant support systems. Major barrier: stigma associated with receiving mental health care; usually particularly prevalent in tight close-knit rural communities in which the fear of being judged or socially penalized usually deters an individual from seeking help(12). AI-powered chatbots provide anonymity for the posts of users, meaning nothing will be judged about them, and they will not be stigmatized. People love talking openly because it helps them begin their journey of talking towards better mental health care.(13).

It has shown that persons who hesitate initially may readily engage with an AI chatbot. These technologies play an important role in breaking the cultural and

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social barriers toward care because these technologies are normalized, accessible, and discreet in discussions about mental health.

Methodology

This study explores how effectively AI-powered chatbots can conquer geographic isolation, reduce stigma in this type of care, and also offer accessible low-cost support in addressing rural-based mental health care. These explorations were based within the controlled lab environment; ensuring a high degree of uniformity and reliability in all matters involved in the study and process of data gathering.

Selection of chatbots and participants.

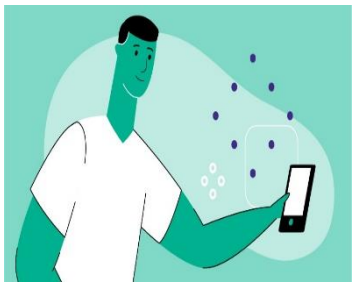

Fig 3:Woebot

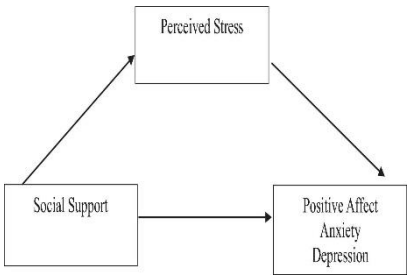

Fig 2:**Wysa**

Fig

Replika

Three AI-enabled chatbots were chosen to be tried and tested through proven ability in mental health interventions, Wysa, and Replika. Each offers a specific set of offerings: support in emotional expression and emotional guidance, therapeutic help, and educational content in these selected AI-powered chatbots.

Woebot: Its specialty is in providing CBT and mood tracking; hence, it is quite useful in handling mental disorders like depression and anxiety(Fig 3)(14).

Wysa

It is known for emotional support, provides personalized therapy, with a high emphasis on empathy, and is particularly suitable for stress and anxiety management (Fig 2).

Replika

Designed mainly to engage users in meaningful conversations, Replika gives space for users to pour out their emotions, hence socially interacting and emotionally healing (Fig 3) (15).

There were 100 volunteers selected in total from a rural community with an age range of 30-50. None of the participants had used any mental health chatbots previously. Participants were recruited from rural areas with very little access to conventional mental health services, and there was significant stigma associated with mental health. Three groups of participants received one of the chosen chatbots over four weeks. Each participant had the devices needed for easy access to the chatbots using their smartphones or computers; thus, no technical barriers would be experienced while engaging with these tools.

Pre-Intervention Assessments

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Before the intervention began, all participants completed a series of baseline assessments that would aid in determining their mental health status and attitudes toward mental health care.
• Beck Depression Inventory (BDI): A widely used scale to measure the severity of depressive symptoms(16).

Generalized Anxiety Disorder Scale (GAD-7), measures the degree of symptoms of anxiety.

Perceived Stigma of Mental Illness Scale (PSMIS), This scale assessed the stigma attached to mental health issues that an individual may internalize, often in rural or close-knit communities where mental health is stigmatized.(17).
These baseline assessments, therefore, were a snapshot of the mental health conditions of participants and compared to post-intervention results to gauge the effectiveness of the interventions.
Intervention Procedure
The intervention was four weeks long, and participants had to interact with the assigned chatbot for at least 30 minutes each day. This period was taken so that the participants were adequately exposed to the features of the chatbots and could experience their full potential benefits. There were several types of interactions offered by the chatbots, such as:
• Emotional Support: The participants communicated with the chatbot by sharing their emotions, anxieties, and stress factors. The chatbot responded sympathetically and helped(16).

Therapeutic Interventions
Some of the chatbots this case, Woebot and Wysa-used evidence-based therapeutic approaches such as CBT to help participants reframe negative thinking and practice coping skills.

Resource Sharing
Chatbots provided educational content on mental health topics, such as coping mechanisms, managing stress, and recognizing signs of mental health disorders.

Emergency Response Management
In the cases where the chatbot sensed high levels of distress or suicidal thinking (using responses from the users), the chatbot was pre-programmed to activate a protocol for escalation that involved giving the contact of emergency service or directing the users to human counselors or services(12).
Participants exercised full flexibility over time and modality of using this chatbot. All the conversations were also recorded for analysis; their respective responses were monitored to ensure that ethical standards were not violated and offered support to participants effectively.

Data Collection
Data were collected throughout the intervention period, focusing on the following areas:

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- **Engagement Metrics**: Frequency, duration, and type of interaction with the chatbot were tracked to get insights about user engagement; how many times a user interacts with a chatbot, and for how long.(12).
- **Sentiment Analysis**

The quality of interaction of a chatbot was evaluated by performing sentiment analysis of the text-based conversation. This analysis measured the emotion or tone of the user's messages and that of the responses by the chatbot. The result of these sentiment scores helped in judging whether users improved their emotional well-being during the study.(17).

- **User Feedback**: After the intervention, participants were asked to complete an anonymous post-intervention survey assessing overall satisfaction with the chatbot. In addition, questions were asked about its perceived helpfulness, ease of use, and whether users found it decreased stigma in seeking mental health support.

Post-Intervention Assessments

All participants were again assessed at the end of four weeks by using the same set of mental health scales: BDI, GAD-7, and PSMIS for measuring changes in depression, anxiety, and stigma. The post-test results were compared with the pretest to assess improvements in mental health status. Qualitative data from user feedback surveys were also analyzed to explore participants' perceptions about the effectiveness of the chatbot and its role in reducing stigma regarding mental health(18).

Component	Details	References
Objective	Evaluate AI chatbots for mental health support in rural areas.	(15)
Chatbots Used	Woebot, Wysa, Replika	(11)
Participants	100 volunteers from a rural community	(16)
Intervention Duration	4 weeks, 30 minutes/day	(18)
Data Collection	Engagement metrics, sentiment analysis, user feedback	(17)
Post-Assessment	BDI, GAD-7, PSMIS pre and post-test	(16)
Data Analysis	Paired t-tests, sentiment analysis, and thematic analysis	(15)
Ethical Considerations	Informed consent, confidentiality, voluntary participation	(11)

Table 2: Methodology for Evaluating AI Chatbots for Mental Health Support in Rural Areas

Data Analysis

The data collected during the intervention were analyzed using both quantitative and qualitative methods.

Quantitative Analysis

Scores in depression, anxiety, and stigma were also compared between pretest

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and posttest using paired t-tests or other appropriate statistical methods to determine whether changes were statistically significant. Decreased scores in depression and anxiety would mean reducing perceived stigma, suggesting a positive impact of the intervention(19).

Qualitative Analysis

Thus, sentiment analysis of the conversations during the chatbots with the users was conducted to understand the emotional flavor of the interactions between the user and the chatbots. Thematically analyzed feedback from the user satisfaction surveys also emerged under three themes: ease of use, perceived helpfulness, and anonymity and feelings of reduced stigma (Table 2) (20).

Ethical Considerations

Ethical considerations were upheld in the study, wherein all participants had to give informed consent and assure them that they knew their purpose of participation and how their data was going to be used. The participants were assured of confidentiality about their personal information, and that participation was voluntary. And they were also informed of being able to withdraw anytime from the study without any consequences. The data obtained during the study were anonymized to ensure participant privacy, and all the research was done within the bounds of relevant ethical guidelines and regulations for data protection.

Results

The impact of AI-powered chatbots on rural mental health service delivery was evaluated in the context of greater accessibility, reduced stigma, and lower costs. Results are presented in terms of user engagement, outcomes regarding improvement in mental health, and further reducing stigma

User Engagement

Frequency of Interaction: Participants interacted with the chatbots on average for 25-30 minutes per session with an average of 5 sessions per week. There was a total completion rate of 90% on the 4-week intervention.

Types of Interactions: Most interactions involved emotional support (45%), followed by therapeutic interventions in the form of Cognitive Behavioural Therapy (CBT) (35%); then came resource sharing at 20%. There has rarely been use of crisis management features, as only 2% of users reported experiencing distress, requiring immediate attention.

2. Mental Health Improvements**:**

- **Depression (BDI):** The preintervention mean BDI score was 20.5 representing moderate depression, whereas the post-intervention mean BDI score was 12.3 representing mild depression. This is a statistically significant change ($p < 0.05$).
- **Fearfulness or anxiety (GAD-7):** The baseline mean GAD-7 score was high at 15.2, indicating moderate anxiety; the post-intervention score was only 9.4, indicating mild anxiety, showing an overall improvement $p < 0.05$.
- **PSMIS -** The mean preintervention score was 35.7, which depicted a high stigma level. The corresponding postintervention score was 22.1, indicating a

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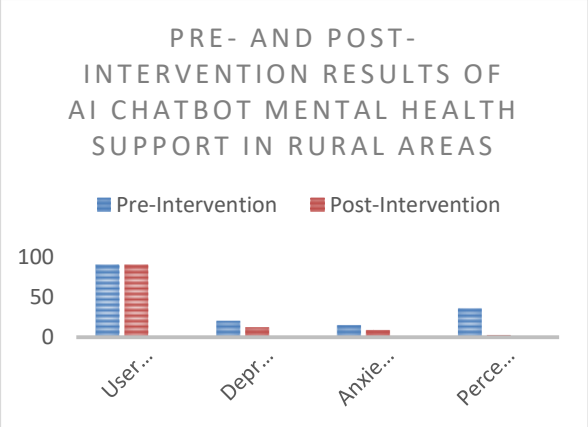
significant decline in stigma. The p-value was <0.05.



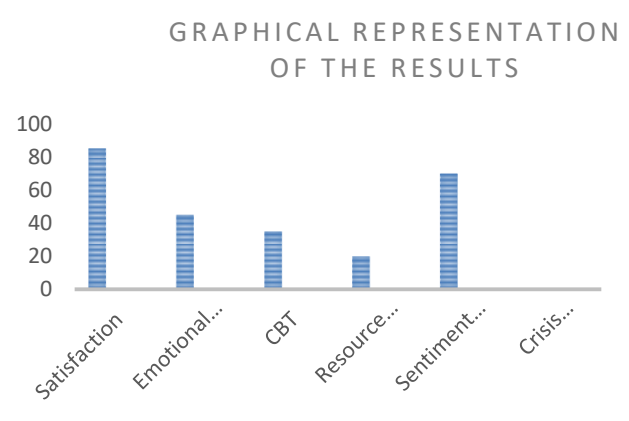


Fig 4: Pre and Post-intervention results **Fig 5: Graphical representation**

Qualitative Feedback

• **Satisfaction:** 85% of participants reported satisfaction with chatbot intervention, citing ease of use, anonymity, and a non-judgmental attitude as essential factors for being satisfied.

•**Barriers addressed:** In general, users reported feeling much more comfortable opening up about mental health issues with the use of the chatbot. Many shared stories that they would never have approached a traditional therapist for fear of judgment (Table 3).

Sentiment Analysis

Emotional Tone: Sentiment analysis of chatbot interactions has shown an overall positive emotional tone; 70% of the interactions were classified as neutral to positive, indicating that the efficacy of chatbots in delivering supportive interactions was achieved.

User Feedback: The conversations with the chatbot were often described as "personal" and "reassuring, however, some reported that they had been more understood than in previous mental health support experiences.

Component	Pre-Intervention	Post-Intervention	Statistical Significance
User Engagement	90% completed intervention (5 sessions/week, 25-30 minutes/session)	90% completed intervention	
Depression (BDI Score)	20.5 (Moderate Depression)	12.3 (Mild Depression)	$p < 0.05$
Anxiety (GAD-7 Score)	15.2 (Moderate Anxiety)	9.4 (Mild Anxiety)	$p < 0.05$
Perceived Stigma (PSMIS)	35.7 (High Stigma)	22.1 (Lower Stigma)	$p < 0.05$

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Satisfaction	-	85% of participants were satisfied	-
Types of Interactions	-	45% Emotional Support, 35% CBT, 20% Resource Sharing	(Fig 5)
Sentiment Analysis	-	70% Positive or Neutral Tone	-
Crisis Management	-	2% of users used crisis features	-

Table 3: Pre- and Post-Intervention Results of AI Chatbot Mental Health Support in Rural Areas

The study results offer empirical evidence that AI-powered chatbots can surmount mental health barriers in rural areas. Results improved in terms of depression and anxiety levels, with a reduction in the perceived stigma attached to mental illness. In extension, that users give positive feedback to the use of chatbots may lead to questions regarding how such chatbots could significantly counteract the mental health care gap in underserved communities.

Discussion:

Artificial intelligence-powered chatbots in mental health, especially in rural, are a big innovation in addressing the major barriers to accessing mental health services. This is because the challenges the rural population faces are mostly disconnection geographically, stigmatized economically, and shortages in the workforce which makes it difficult to offer adequate mental health services (20). The modern, scalable nature of AI-powered chatbots could help bridge the gap in mental health treatment; they are less expensive but offer accessible support for people living in underserved regions. These study results underscore the potential of AI-powered chatbots to overcome some of these barriers and improve mental health outcomes among rural populations(21).

Overcoming Geographic Barriers

Geographic isolation poses one of the most extreme challenges facing residents of rural areas, which creates problems while accessing mental health services. Reaching a mental health professional may require people residing in rural regions to travel long distances with high costs and time. The challenge is even more pronounced in areas with bad infrastructures in transportation or environmental conditions that make it difficult to access. Secondly, the mental health professional workforce is limited in rural settings. Many counties lack psychiatrists, psychologists, or social workers. The National Rural Health Association determines that nearly 65% of rural counties in the United States lack at least one in-house mental health professional to whom to turn for support(22).

This, at the minimum, as far as the problem is concerned, can be solved by AI-powered chatbots, which provide instant access to mental health care through smartphones, tablets, or computers. Since this technology does not regard any geographical boundaries, getting people support without traveling is possible. In this study, rural participants had major mental health improvements even though they never accessed any face-to-face therapy.(23). The study demonstrated that AI chatbots can be an entry point when services are required,

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and 24/7 access to emotional support along with psychological interventions like CBT could be a game-changer in managing such mental health conditions, where this care is in short supply or negligible.

Significantly, the ease of access and convenience of the use of AI-powered chatbots have been quite advantageous, especially to the rural population. AI-powered mental health tools bridge barriers to care by allowing people to interact with a chatbot right from the comfort of their homes. Moreover, AI chatbots have been proven to provide users with immediate interventions immediately needed for cases of mental health crises requiring timely responses. In many rural areas, mental illness has been stigmatized, and people never come out to the public for fear of being judged by fellow citizens. Some practices involve the belief that going for help concerning mental illness is a sign of weakness or moral failure. This stigma, coupled with a lack of knowledge relating to mental illness, encourages the stigma and increases the chances of silent maladies. In this research, people who were initially unwilling to see a live therapist reported being more comfortable communicating with the AI-powered chatbot, because this was an anonymous, judgment-free setting for which they could voice their issues. (24).

The findings of this study are that AI-powered chatbots reduce the stigma associated with mental health care because they give room to individuals to confidentially interact with mental health resources in private. The participants of the study maintained that the chatbot was a safe space where they could reveal their feelings without the threat of disclosure. Anonymity also played a great role in fostering trust and encouraging people to engage with the chatbot, which ultimately led to positive outcomes on mental health. People were able to initiate conversations with AI-powered chatbots concerning their mental health in a less intimidating and more accessible manner than traditional therapy sessions.

Moreover, the capability of chatbots to provide emotional support and therapeutic interventions such as CBT in an individualized manner helped lift user engagement further(13). The findings suggest that patients who spent more time communicating with the chatbot had greater improvement in their mental health, as gauged by low scores in depression and anxiety. Perhaps increased engagement and willingness to participate could be attributed to the personified support of the chatbot, showing the ability to provide solutions to the specific needs of the user.

Another major constraint in rural areas for individuals requiring mental health care services is the economic barrier. The therapies become too expensive due to the costs of sessions, medication, and transportation, as well as insurance. To make things worse, it is sometimes difficult, even impossible, for low-income earners to afford these services, and, therefore, many do not seek such care. For instance, in rural areas, the marginal quality of mental health care is often in line with the generally lower income levels, and coverage for health insurance is much less comprehensive(25).

AI-based chatbots have been found as a low-cost substitute for real mental health care services. The findings from this study conclude that high-standard mental health support that is delivered by AI-based chatbots will be far more affordable than face-to-face therapy sessions. As such, participants noted that this intervention based on the chatbot was cheap and accessible in bringing about

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greater equity in the mental health care that reaches people living in rural areas. The cost-effectiveness of AI-powered chatbots is particularly germane in the context of workforce shortages and limited resources in rural communities, where a scalable solution can connect hundreds of people at once(26).

With the ability to interact with thousands of users at the same time, AI chatbots unlike human therapists can work with a considerable number of clients concurrently. This scalability enables mental health services to reach all who need them, unencumbered by human provider-related limitations. Given that AI chatbots can offer interventions at a distance, it now becomes possible for people to access mental health support where they might not have due to financial or logistical reasons(27). The adoption of AI-powered chatbots holds great promise, but it also creates a series of ethical and technical considerations. Above all, the privacy and security of user data constitute the greatest challenge for maintaining user trust. Therefore, participants in this study were more concerned about the confidentiality of their personal information. The developers need to strictly follow data protection laws so that information concerning the user is well taken care of. In addition, the efficacy of interventions carried out by the chatbot would largely depend on its comprehensive understanding and interpretation of user inputs(28). It has also advanced with improvements in natural language processing and machine learning; however, even so, there are difficulties in handling subtle cues of distress or complex emotional nuances.

Another factor is the role of human monitoring. While AI chatbots are very effective for first-tier support and interventions, they should not be used as a replacement for human therapists. The study provides the point that within an entire framework of mental care that would include availability to human professionals when needed, AI chatbots should be integrated. Therefore, an AI-powered chatbot may act as a complement to regular service delivery in mental health by nudging users toward the appropriate resources and opening professional care at the moment when needed.

Conclusion

Chatbots powered by artificial intelligence bring forth significant change and are seen as an opportunity to overcome the long-standing barriers to mental health care in rural areas. AI-powered chatbots can provide access to scalable low-cost solutions, abate stigma, and ensure support is made available to people, thus reducing the banes of geographic isolation in underserved regions. The findings presented here show that AI-powered chatbots can therefore address the challenges presented above, thereby helping to improve mental health among rural populations. However, careful implementation must be tempered with ethical considerations, careful evaluation, and coordination between technologists, mental health professionals, and policymakers so that they prove effective in use, all while protecting the privacy of users. Further investment and innovation in AI-powered chatbots may help bring mental health care to everybody's reach, making it equitable.

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Author contribution

The authors confirm their contribution to the paper as follows: study conception and design by Muhammad Asim, Data Collection by Hoor Fatima Yousaf, Analysis and interpretation of the result by Usama Nasir Draft, and manuscript preparation by Muhammad Abubakar Farooq and Faraya Yousaf. All authors reviewed the results and approved the final version of the manuscript.

Data Availability

All the procedure is performed in the Lab and related data is collected from the authentic net resources.

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The authors declare no conflict of interest.

References

Collaborators GMD. Global, regional, and national burden of 12 mental disorders in 204 countries and territories, 1990–2019: a systematic analysis for the Global Burden of Disease Study 2019. The Lancet Psychiatry. 2022;9(2):137-50.

Arias D, Saxena S, Verguet S. Quantifying the global burden of mental disorders and their economic value. EClinicalMedicine. 2022;54.

Olff M, Primasari I, Qing Y, Coimbra BM, Hovnanyan A, Grace E, et al. Mental health responses to COVID-19 around the world. European Journal of Psychotraumatology. 2021;12(1):1929754.

Whaibeh E, Mahmoud H, Vogt EL. Reducing the treatment gap for LGBT mental health needs: The potential of telepsychiatry. The journal of behavioral health services & research. 2020;47(3):424-31.

Youngson N, Saxton M, Jaffe PG, Chiodo D, Dawson M, Straatman A-L. Challenges in risk assessment with rural domestic violence victims: Implications for practice. Journal of Family Violence. 2021;36:537-50.

Keisler-Starkey K, Bunch LN. Health insurance coverage in the United States: 2019. Washington, DC: US Census Bureau. 2020.

Gruetzemacher R, Whittlestone J. The transformative potential of artificial intelligence. Futures. 2022;135:102884.

Basharat I, Shahid S. AI-enabled chatbots healthcare systems: an ethical perspective on trust and reliability. Journal of Health Organization and Management. 2024.

Torous J, Bucci S, Bell IH, Kessing LV, Faurholt-Jepsen M, Whelan P, et al. The growing field of digital psychiatry: current evidence and the future of apps, social media, chatbots, and virtual reality. World Psychiatry. 2021;20(3):318-35.

Tabe BN. Mental Health Provider Shortage in Rural Communities. 2024.

Duan L, Zhu G. Psychological interventions for people affected by the COVID-19

ISSN Online: 3007-3154
ISSN Print: 3007-3146

epidemic. The Lancet Psychiatry. 2020;7(4):300.
Brown JE, Halpern J. AI chatbots cannot replace human interactions in the pursuit of more inclusive mental healthcare. SSM-Mental Health. 2021;1:100017.
Boucher EM, Harake NR, Ward HE, Stoeckl SE, Vargas J, Minkel J, et al. Artificially intelligent chatbots in digital mental health interventions: a review. Expert Review of Medical Devices. 2021;18(sup1):37-49.
Lakho S, Farooqi SA, Zafar F, Siraj S. Developing AI-Powered Chatbots for Mental Health Support. Spectrum of engineering sciences. 2024;2(3):179-99.
Haque MR, Rubya S. An overview of chatbot-based mobile mental health apps: insights from app description and user reviews. JMIR mHealth and uHealth. 2023;11(1):e44838.
Upton J. Beck depression inventory (BDI). Encyclopedia of behavioral medicine. 2020:202-3.
Wang Y-P, Gorenstein C. The Beck depression inventory: Uses and applications. The neuroscience of depression: Elsevier; 2021. p. 165-74.
Estebanez-Pérez M-J, Pastora-Bernal J-M, Martín-Valero R. The effectiveness of a four-week digital physiotherapy intervention to improve functional capacity and adherence to intervention in patients with long COVID-19. International journal of environmental research and public health. 2022;19(15):9566.
Shih C-A, Huang J-H, Yang M-H. Anti-stigma psychosocial intervention effects on reducing mental illness self-stigma and increasing self-esteem among patients with schizophrenia in Taiwan: A quasi-experiment. Asian Journal of Psychiatry. 2022;73:103171.
Tang Q, Yang S, Liu C, Li L, Chen X, Wu F, et al. Effects of mindfulness-based cognitive therapy on stigma in female patients with schizophrenia. Frontiers in psychiatry. 2021;12:694575.
Khawaja Z, Bélisle-Pipon J-C. Your robot therapist is not your therapist: understanding the role of AI-powered mental health chatbots. Frontiers in Digital Health. 2023;5:1278186.
Morales DA, Barksdale CL, Beckel-Mitchener AC. A call to action to address rural mental health disparities. Journal of clinical and translational science. 2020;4(5):463-7.
Mongelli F, Georgakopoulos P, Pato MT. Challenges and opportunities to meet the mental health needs of underserved and disenfranchised populations in the United States. Focus. 2020;18(1):16-24.
Raghavan R, Brown B, Horne F, Kumar S, Parameswaran U, Ali AB, et al. Stigma and mental health problems in an Indian context. Perceptions of people with mental disorders in urban, rural, and tribal areas of Kerala. International Journal of Social Psychiatry. 2023;69(2):362-9.
Coombs NC, Meriwether WE, Caringi J, Newcomer SR. Barriers to healthcare access among US adults with mental health challenges: A population-based study. SSM-population health. 2021;15:100847.
Zhang Z, Wang J. Can AI replace psychotherapists? Exploring the future of mental health care. Frontiers in Psychiatry. 2024;15:1444382.
Grodniewicz J, Hohol M. Waiting for a digital therapist: three challenges on the

ISSN Online: 3007-3154
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path to psychotherapy delivered by artificial intelligence. Frontiers in Psychiatry. 2023;14:1190084.

Roslan FABM, Ahmad NB. The rise of AI-powered voice assistants: Analyzing their transformative impact on modern customer service paradigms and consumer expectations. Quarterly Journal of Emerging Technologies and Innovations. 2023;8(3):33-64.