Chapter 3
Chatbots as Tools for Psychoeducation and Self-Help in Mental Health

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ABSTRACT

The chapter highlights the role of mental health chatbots in solving problems in global mental health. It aims to explore how AI-powered conversational agents bridge the gap between growing demand and limited availability of mental health services. The authors explain advantages of chatbots, including accessibility, affordability, and user anonymity. They investigate the effectiveness of chatbots in improving treatment outcomes, meeting user needs, and improving operational efficiency. In addition, the chapter highlights the ability of chatbot as a knowledge sharer that seamlessly integrates information from various sources and keeps professionals up to date with

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current events. It deals with psychoeducation in clinical and non-clinical populations, covering biological, cognitive, emotional, and behavioural aspects. The authors also discuss the potential of chatbots in screening and self-help. Finally, they emphasise the importance of collaboration between psychologists, physicians, and engineers to optimise the development of chatbots to respond dynamically to user needs.

BACKGROUND

Mental health comprises our emotional, psychological, and social well-being. It affects our thinking, feelings, perception of the world, and our actions. Hence, prioritising mental health is essential for overall well-being, influencing our quality of life, productivity, and resilience (Bezerra et al., 2018). Much like we care for our physical health through exercise and a balanced diet, attending to our mental health is crucial. It directly impacts cognitive functions, emotional connections, and the ability to navigate life's challenges. It also helps us determine how one handles stress, relationships with others, and possible healthy and unhealthy choices in life (Fusar-Poli et al., 2020). However, despite the importance of mental health, the numbers suggest an overall treatment gap for mental health disorders.

The overall treatment gap for mental disorders ranged from 70% to 92% across various disorders (Murthy, 2017). The National Mental Health Survey by the National Institute of Mental Health and Neurosciences reported an overall weighted prevalence for any mental health morbidity at 13.7% (Singh, 2019). According to Math et al. (2019), the number of mental health service providers is almost negligible compared to the demand, further highlighting the gravity of the situation. The ideal number of psychiatrists, psychologists, psychiatric social workers, and mental health nurses is 1/10,000 for developed countries. However, in India, the current numbers are: psychiatrists – 0.2/100,000, psychologists – 0.03/100,000, psychiatric social workers – 0.03/100,000, and mental health nurses – 0.05/100,000 population. Various innovative approaches are needed to bridge this huge gap.

Worldwide, mental health care faces a multitude of similar challenges, encompassing high costs, supply-side limitations, prolonged waiting times (often 2-8 weeks), frequent misdiagnosis of personality disorders as mood disorders, outdated treatment methods, low awareness, dissemination of incorrect information, absence of centralised records, lack of intermediary support between therapy sessions, lack of distress helplines, talk support and reminders. Additionally, social stigma, particularly prevalent among older generations, further complicates access to mental health services. The emergence of online solutions during the COVID-19 pandemic has mitigated stigma by offering services from the comfort of one's home, sometimes anonymously, resulting in increased demand. However, these solutions have

yet to comprehensively address the broader spectrum of issues and supply-side constraints inherent in mental health care (Meghrajani et al., 2023; Moghimi et al., 2023; Wainberg et al., 2017).

In this scenario, digital interfaces are emerging as viable alternatives for reducing this gap and making mental health care and treatment accessible and affordable. Alongside smartphones, VR technology, and E-learning systems, artificial intelligence (AI) is an effective option. It can detect, predict, and assess mental health issues, thus working as a preventive measure for overall well-being (Ettman & Galea, 2023). A chatbot is a computer program that simulates human conversation using conversational artificial intelligence (CAI) techniques such as natural language processing (IBM, n.d.). Chatbots are typically freely available 24/7 for users to converse, obtain information, and access suitable recommendations. Currently, several mental health chatbots such as Anna, Woebot, Earkick, Virtua Health, Healo and Wysa exist. Many of these chatbots use generative AI and Natural language processing (NLP) to imitate human language and conversations.

Natural language processing (NLP) helps computers understand the meaning, intentions, and emotions in written text. It uses rules and algorithms inspired by how people use language to make sense of it all. With the help of NLP, generative AI models can understand and generate human-like text (Gupta, 2023). This enables chatbots to understand a user's query or statement, then formulate an appropriate response. Talviya (2023) highlights that it is also possible to employ machine learning algorithms to recognize user intents based on the input they receive. This involves categorising user queries into predefined categories or actions, allowing the chatbot to determine the user's purpose or goal. This aids in directing the conversation flow and providing relevant assistance to users. Because of this capacity to discern and recognize, chatbots can possibly differentiate between the degrees and severity of mental health issues of the user. High-risk cases can be connected to the nearest distress helpline, whereas moderate-risk cases can be matched to the right therapist based on their personality and preferences. Low-risk clients can be offered digital solutions - meditation audios, exercises, self-work-based pathways, mood trackers, reading lists, movie recommendations, relatable content (jokes, memes), as well as matching to support groups and peers.

Artificial intelligence also can take in information about various therapeutic modalities and modify responses accordingly. An example of this can be seen in the work of Andrade-Arenas et al. (2024), where they developed and evaluated a chatbot based on CBT principles. Eventually, both digital and talk support options in chatbots can incorporate the biopsychosocial perspective by connecting the latest research integrating fields like epigenetics and psychoneuroimmunology. Furthermore, a variety of therapeutic modalities, including Gestalt, acceptance and commitment therapy, solution-focused therapy, and trauma-informed approach,

contribute to a holistic solution, drawing from Eastern mindfulness and Western psychology. In adopting a community-driven approach, chatbots can also foster an environment that encourages the exchange of best practices among therapists and mental health professionals. This collaboration can enhance therapy quality and record-keeping. The detailed history collected by a chatbot not only has the power to streamline record-keeping but can also reduce the time therapists spend, resulting in higher-quality care (Chen et al., 2023; Co et al., 2022). As a result of such features, chatbot services can aid in improving accessibility to mental health care by reducing the associated stigma and managing the shortage of mental health professionals. However, these services are not a replacement for therapy but aim to assist those with less severe issues or are to be used in addition to therapy (Perrone, 2024). Viduani et al. (2023) highlight that using chatbots in clinical settings is advantageous in increasing access to mental health care, facilitating data collection and management, and promoting patient disclosure. Nonetheless, it is also important to consider patient safety, privacy and confidentiality of data, and the management of emergencies in this context.

FEATURES OF A CHATBOT

The emergence of artificial intelligence (AI) chatbots has dramatically changed the way humans interact with computers in recent years. This technology has transformed industries such as customer service, healthcare, management, education, and almost all areas of our lives. Powered by state-of-the-art natural language processing (NLP) algorithms and machine learning, AI chatbots are not just a passing fad but they have established themselves as essential components of our online lives, which integrates in our daily routines and provides us with a wide range of tasks and questions (Kulkarni & Jaiswal, 2023). Chatbots have several different use cases, which can be classified under certain parameters – knowledge domain, service provided, goals, input processing and response generation method, human-aid, and build methods. Classification based on the input processing and response generation method takes into account the method of processing inputs and generating responses.

Three models are used to produce the appropriate responses – rule-based, retrieval-based, and generative (Bao et al., 2020). Rule-based chatbots can be commonly seen in online chat systems. They use preset rules to respond to user messages. It uses the system response based on a fixed predefined set of rules, based on recognizing lexical form of the input text without creating any new answers in the text. The knowledge used in these chatbots is hand-coded and organised and presented with conversational patterns. A more comprehensive rule database allows the chatbot to reply to more types of user input. However, this type of model is not robust to

spelling and grammatical mistakes in the user input. In more human-like bots, multi-turn response selection takes into consideration previous parts of the conversation to select a response that is relevant to the whole conversation context. Some examples include chatbots that offer information about hours of business or assist with basic customer service inquiries (Oracle Cloud Infrastructure (OCI), n.d.).

Different from the rule-based model is the retrieval-based model which uses machine learning models, such as statistical NLP models and sometimes supervised neural networks, to interpret the user input and determine the most fitting response to retrieve. Like rule-based models, retrieval-based models rely on predefined responses, but they have the additional ability to self-learn and improve their selection of response over time (Codecademy, n.d.). The generative model generates answers in a better way than the other two models, based on current and previous user messages. These chatbots are more human-like that use machine learning algorithms and deep learning techniques (Bao et al., 2020).

Intersection of Chatbots and Mental Health

Conversational agents (CAs), or chatbots, have shown substantial promise in the realm of mental health care offering a wide range of functionalities to address various challenges faced by individuals. Powered by NLP, machine learning, and deep learning, these AI-based CAs possess expanding capabilities to process more complex information and thus allow for more personalised, adaptive, and sophisticated responses to mental health concerns. (Mesko, 2023). They assist with preliminary diagnosis, facilitate consultations, provide psychoeducation, and deliver treatment options while also simultaneously playing a role in offering social support and boosting mental resilience to the users (Li et al., 2023). These chatbots have the potential to address the needs of individuals with mental disorders, particularly those who may be hesitant to seek traditional therapy due to stigmatisation. They provide a safe and non-judgmental space for individuals to seek support and guidance, reducing stigma and improving mental hygiene.

There are already several chat-based AI platforms in the global market that identify mental health concerns, track moods, and deliver interventions like cognitive behavioural therapy. Some examples include Replika, a US-based virtual AI companion that facilitates emotional processing and connection in a safe environment. Xiaotian is from China and was built with professional deconstruction skills. Xiaotian listens, analyses, and guides conversations to clarify true feelings (XinhuaNet, 2021). Healo, a mental health chatbot by Infiheal, India, is focused on holistic mental healthcare. It employs an advanced personality assessment algorithm and risk profiling for triaging, and uses Generative AI for functionality like

venting, advice, recommendations, and guided meditations. Various advantages of such chatbots include:

Accessibility, Affordability, Agency: A 2021 national survey by the American Psychiatric Association commissioned by Woebot Health, one of the leading therapeutic chatbot companies, in a study found that 22% of adults used a mental health chatbot, and 47% said they would be interested in using one if needed. Among the respondents who had tried a mental health chatbot, nearly 60% said they began to use during the COVID-19 pandemic, and 44% said they used chatbots exclusively and did not see a human therapist. "The most common reasons people cited as to why they used and/or might be interested in using a chatbot included that the tool was cheap, easy to use, and accessible anytime (24/7)." This does not imply that chatbots are surrogates for human-delivered psychotherapy, even in cases where they become more sophisticated. Darcy acknowledged "A tennis ball machine will never replace a human opponent, and a virtual therapist will not replace a human connection," she said. Instead, Chatbots support human clinicians by providing situational help to patients in between therapist appointments.

By using AI chatbots, individuals can access mental healthcare services from the convenience of their own homes through their mobile phones, without the need to schedule an appointment or travel to a clinic. This is particularly beneficial where mental health services are lacking, i.e. for individuals who live in remote areas, or for those who have difficulty accessing mental healthcare services due to financial or logistical reasons. Additionally, bots can provide support and guidance 24/7, allowing individuals to access help whenever and at the frequency they need it. Overall, the use of chatbots has the potential to greatly improve access to mental healthcare services, making them more widely available and easier to access for individuals around the globe (Yunus et al., 2020).

User-friendly Interface: Chatbots are the novel innovative and interactive way to communicate, especially with youngsters. For instance, Ash, an Australia, CBT-based App was designed to enhance teen mental health at schools. It was developed in response to the increasing number of youth struggling to cope with stress at school, feelings of depression and anxiety, and the lack of adequate help for their problems (Monash University, 2021). The ease of use and interface can help us open-up and connect more easily. Bots are human-like representations of information providers that are increasingly applied within popular private messenger services that most of us are already familiar with, such as Facebook Messenger, Kik, Telegram, Viber, and WhatsApp. Similarly, in mental health bots too, users type questions (i.e. queries) in natural language, and meaningful answers are returned. The chatbot parses the content of the user input (questions such as "Why do I have anxiety?") and intelligently responds by using advanced AI capabilities The chatbot conversations can be perceived as meaningful and trustworthy. Thus, chatbots provide a text-based

conversational interface for information, which delivers immediate feedback in a human-like way. (Skjuve & Brandtzæg, 2017)

Free from Bias and Stigmas: One of the most profound impacts of AI in mental healthcare is its role in reducing stigma. For many, the mere act of seeking help can be daunting due to societal prejudices (for example, marginalised communities like people of colour and LGBTQ+ individuals,) and discrimination (based on categories like caste or socio-economic background). These are communities who become "othered" pushed away from the "margins" of mainstream society. They are excluded in various ways, such as, lowering participation in education, work and in healthcare access leading to lesser health and social outcomes (Robards et al., 2020; Shukla, 2022; Thapa et al., 2021). In this regard, chatbots offer more inclusive and acceptable space for stigmatised communities. AI driven platforms offer anonymity, allowing individuals to seek support without the fear of judgement. The Chatbot conversations can be perceived as meaningful and trustworthy. This is especially crucial for the youth and middle-aged population, who often grapple with societal pressures and are at ease with technology. Many people hesitate to seek traditional therapy because they feel uncomfortable discussing their issues with a stranger or fear the stigma associated with seeking mental health support. By providing a safe, non-judgmental space, AI tools are making mental health discussions mainstream (Intelliverse.ai, 2023).

Evidence-Based Therapy: Chatbots can be programmed to offer evidence-based therapeutic techniques such as cognitive-behavioural therapy (CBT). CBT is a common form of therapy used to treat mental health issues like anxiety and depression. By using chatbots, individuals can receive benefits of CBT in a convenient and accessible way. Some chatbots are fully automated and some use human interfaces. Woebot is a fully automated conversational agent developed by Woebot Labs in San Francisco. It treats depression and anxiety using a digital version of time-tested cognitive behaviour therapy Interpersonal psychotherapy (IPT), and dialectical behaviour therapy (DBT). In a feasibility study which compared 34 college students undergoing therapy with Woebot and 36 students who were a part of the information-only control group, it was found that after 2 weeks, participants in the Woebot group had shown a significant decrease in depression scores as measured by PHQ-9. Chatbots like Ellie almost serve as virtual therapists as they can detect subtleties in facial expressions, rates of speech, or length of pauses and respond accordingly. It also provides an option to meet an actual therapist (Singh, 2019).

Consistency and Reliability: Chatbots offer consistent and reliable support without the risk of human error. They track progress and provide reminders for self-care activities or appointments, ensuring that individuals stay on track with their mental health goals. Consistent support and reminders can help individuals stay motivated and engaged in their mental health journey. Wysa, a US based AI-guided CBT app,

integrates meditation, yoga, and guided journaling activities. Healo by Infiheal, an India, also provides consistent support and reminders for self-care.

Increased Engagement and Empowerment: Chatbots can increase engagement and empowerment by encouraging individuals to take an active role in their mental health journey. Youper, a US based app utilises CBT, conducts daily check-ins, tracking users' moods, thoughts, and feelings. A study from Stanford University showed significant improvement in symptoms of depression and anxiety after just two weeks of using the Youper app (Youper, n.d.). Bots can provide rich psycho-education, educational resources, tools, and exercises that individuals can use to manage their symptoms and improve their mental wellness. Additionally, chatbots can provide encouragement and positive reinforcement to individuals, improving their motivation and overall treatment outcomes (Sachdeva, 2023).

Improved Crisis Management: How to prevent the next suicide is one of the most common and still highly complicated questions in the field of psychology and psychiatry. Indeed, it is a question of critical importance given that suicide poses a grave public health concern, with approximately 817,000 individuals dying by suicide annually. This staggering figure underscores the urgent necessity for a comprehensive investment in a broad array of suicide prevention strategies aimed at curtailing the global suicide prevalence. Chatbots can be used as a valuable tool for crisis management and suicide prevention as they can provide immediate support and resources to individuals in crisis, and can also alert emergency services or caregivers if necessary. Bots can help save lives by providing immediate support to those in distress (Sachdeva, 2023). An article published by research square suggests that GenAI has the potential to play a crucial role in promoting safe reporting practices, with implications for public health. The method involved two independent human reviewers and two AI systems, Claude.AI and ChatGPT-4, which assessed 40 suicide-related articles from online platforms based on the WHO's 15 criteria. The findings indicated strong agreement between ChatGPT-4 and the two human reviewers (0.81–0.87). Strong agreement was also found between Claude.AI and the two human reviewers (0.73–0.78) (Niederkrotenthaler et al., 2021).

From the above, it can be seen that various features of chatbots are of great help in supporting people with mental health issues. One can argue how it might be useful for psychoeducation, especially in clinical populations, and for self-help in general populations.

CHATBOTS AS A PSYCHOEDUCATIONAL TOOL FOR THE CLINICAL POPULATION

Psychoeducation is the process of providing information to the client and family to elicit their support in working together with the mental health professional. The main goals of psychoeducation include – (1) ensuring basic knowledge and competence of patients and their relatives about the illness, (2) providing insight into the illness, (3) promoting relapse prevention, and (4) engaging in crisis management and suicide prevention. By incorporating aspects of cognitive behaviour therapy, group therapy, and education, psychoeducation is considered to be an effective form of psychotherapy for both the clinical and non-clinical populations (Sarkhel et al., 2020). Anderson et al. (1980) highlighted that psychoeducation consisted of four essential elements – briefing the patients about their illness, problem-solving training, communication training, and self-assertiveness training. However, the timing and content of the psychoeducation sessions may vary based on the nature of the issue, the audience, and the focus of the session.

Role of Psychoeducation

The evidence-based practice of psychoeducation across mental health settings is effective due to its flexibility and range of elements included (Lukens & McFarlane, 2006). For clients experiencing schizophrenia, psychoeducation not only improves satisfaction with mental health services and treatment adherence but also helps reduce relapse and hospital readmission rates and enhance functioning and quality of life (Xia et al., 2011). It also helps reduce the recurrence of bipolar disorder and depression (Goodwin et al., 2016), increases positive attitude towards attention-deficit/hyperactivity disorder (Nussey et al., 2013) and has positive effects on stress and anxiety (Klainin-Yobas et al., 2016). Additionally, being a relatively low-risk psychosocial treatment, psychoeducation assists the clinical high-risk (CHR) population in preventative and early treatment interventions (McGorry et al., 2010) as well as reduces the stigma associated with psychiatric labels (Herrera et al., 2023). However, the accessibility of psychoeducation is limited due to factors such as perceptions about its significance, lack of knowledge and skills for its implementation, lack of training, and lack of adequate reimbursement for these services (Motlova et al., 2017).

Role of Chatbots in Psychoeducation

In recent years, there has been an increase in demand for mental health services. The simultaneous increase in the capabilities of artificial intelligence has led to the development of digital mental health intelligence (DMHI) to support diagnostics and screening, symptom management and behaviour change, and content delivery using chatbots (Boucher et al., 2021).

The use of chatbot-based psychoeducation is said to reduce the cost, time, and space constraints that prevent clients from receiving adequate treatment; however, the effectiveness of chatbot-supported psychoeducation needs to be considered simultaneously. A study by Selaskowski et al. (2023) examined the benefits of self-guided psychoeducation based on a chatbot for adults with attention-deficit hyperactivity disorder. The results of the randomised control trial indicated that both chatbot-based and conventional app self-guided psychoeducation were equally beneficial and safe for the participants. Another study by Jang et al. (2021) reported similar results for the chatbot application "Todaki". Participants in the study mentioned that they enjoyed the empathic and friendly character but perceived it to have an unnatural flow of conversation.

Several researchers have reviewed the effectiveness of chatbots in mental health. A systematic literature review by Vaidyam et al. (2019) examined ten studies that used chatbots offering primarily dynamic user input and output response for the clinical population. These studies were selected from six databases containing 1466 records based on the inclusion criteria. The results indicated that there was high satisfaction and potential for psychiatric use of chatbots across all studies. It was not only beneficial for psychoeducation and adherence but also increased accessibility to treatment by reducing stigma and cost. However, drawbacks were also reported, such as limited and time-inappropriate responses and blurring of therapeutic boundaries. There were mixed results regarding the lack of a human in such interactions, with some studies reporting higher disclosure of sensitive information in the absence of human involvement and others studies reporting the opposite. Overall, there was positive user satisfaction, indicating that clients found benefits and enjoyed using chatbot services.

A scoping review by Ahmed et al. (2023) examined the features of chatbots available for anxiety or depression. The review included forty-two studies by filtering six bibliographic databases, which returned 1302 citations. There were different methods of support offered by the chatbots, including traditional therapeutic counselling, unique features for depression and anxiety, empathetic phrasing, and care-receiving. The care-receiving chatbots, such as Vincent, Gloomy, and Perla, encourage users to practise self-reflection and self-compassion by facilitating a deeper level of understanding of their experiences. The findings indicated favourable patient

outcomes and adoption of chatbots; however, limited quality research is available. Another review by Boucher et al. (2021) focused on AI-based chatbots and used a case study on Happify Health's AI chatbot, Anna. The authors highlighted that it is important to examine the perceptions and acceptance of professionals and clients regarding the use of the mental health services offered by chatbots. Further, the usage of these chatbots could also vary based on the user demographic profile. It is also imperative to understand user perceptions of the social attributes, empathy, and therapeutic interactions offered by the chatbot in comparison to those provided by human therapists. Finally, the safety and ethical implications of using chatbot-based mental health services need to be evaluated. Nonetheless, the authors mention that AI-based chatbots help reduce the workload and balance the shortage of mental health professionals. However, the widespread adoption of chatbot services and educating and working with mental health professionals will improve the quality and effectiveness of chatbot services.

Based on existing literature, the use of digital mental health interventions is increasing. Although there is limited evidence to support the effectiveness of all such DMHIs, the available research shows benefits in promoting understanding and treatment of issues faced by the clinical population. It also overcomes common obstacles to mental health services, such as the stigma surrounding labels, limited accessibility and availability of services, and the cost of availing services. However, ensuring standardised outcomes reporting is essential to provide a generalisable picture regarding the effectiveness of chatbot-based psychoeducation. Over the years, there could be an increase in the use of chatbots as essential tools to support mental health or as therapists themselves. Hence, promoting the use of chatbots and examining their benefits and challenges is the critical step to ensure their safe and effective usage.

Chatbots offering Psychoeducation

In the existing reign of digital mental health initiatives, several mental health chatbots are designed to support specific issues. Many of the chatbots, such as Woebot, Wysa, Youper, Healo, Todaki, and Ensemble, assist users in dealing with depression and anxiety-related problems. Some chatbots are also designed to provide mental health support and encourage users to practise self-care. The Vincent chatbot is a care receiver which aims to promote self-compassion among its users. Unlike other chatbots that provide helpful strategies, Vincent shares its challenges and asks for advice from the user. Lee et al. (2019) reported that participants in the care-receiving condition of the Vincent chatbot showed a significant increase in self-compassion in comparison to those in the care-giving condition of the chatbot. Earkick is another such chatbot specialising in providing personalised chats based

on the users' unique needs and preferences, simultaneously ensuring privacy and confidentiality (Frey, 2024). Chatbots like Moodfit, Tess (Stephens et al., 2019), and Student Bodies (Dev et al., 1999) also offer psychoeducation to help users deal with body image issues, difficult emotions, procrastination, and rumination. Through the use of tracking and summary reports, users can have insights into their mental health and lifestyle and make required modifications (Valera, 2023).

CHATBOTS AS A SELF-HELP TOOL FOR THE GENERAL POPULATION

In contemporary parlance, self-help is a popular term often used to indicate a wide array of practices ranging from relaxing to invigorating and to bring about behavioural and attitudinal changes (for example, lifestyle changes, habit building, handling distress). This may involve self-help books, attending support and 12-step groups, and referring to popular internet forums or podcasts for advice, stress management techniques, and alternative medicine. In general, such methods can be applied to any facet of an individual's life- physical, psychological, financial, or professional. In the context of mental health, self-help can be seen as any preventive strategies and techniques a person might apply to manage their psychological well-being (Chang et al., 2021; Norcross, 2000).

Contrary to popular belief, the concept of self-help has been practised for a long time. Late 18th-century and early 19th-century history suggests that the self-help movement had a pluralistic approach. People joined each other in seeking support and bettering themselves in the face of a physical or mental illness, or even for cognitive betterment. It can be inferred that this aided in the birth of groups like Alcoholics Anonymous (AA) and Narcotics Anonymous (NA) (Flora et al., 2010).

In the age of digital intervention, self-help strategies can be applied seamlessly to both individual and group settings. They can be broadly divided into two categories: Guided (the individual has professional help while they still pursue the self-help material) and unguided (simple self-help strategies that can be used without professional help) (Jorm & Griffiths, 2006). Self-help has also been used interchangeably with self-care and self-management techniques, which will be discussed later. A significant overlap exists between what they entail, suggesting they can be grouped under one term (Town et al., 2023)

Need for Correct Self-help in the General Population

Despite the criticism from some professionals, self-help as an industry persists and is effective when compared to no-treatment control groups. (Mains & Scogin, 2003; Rosen, 1993). It can be argued that much of the burden of symptoms of anxiety, depression, or any other issue that is perceived as minor in general is attributable to subclinical symptoms. Using self-help strategies primarily in these scenarios can prevent further clinical development and can be encouraged (Jorm & Griffiths, 2006). Meta-analysis of Self-help in children and adolescents (Benett et al., 2019) echoes the same sentiment, claiming that it reduces the stigma around mental health issues. In a research paper (Biringer et al., 2016), a case is made for how learning about self-management techniques like positive activities, habits, and surrounding yourself with positive people can initiate recovery and promote self-efficacy before even stepping into mental health treatment sessions aided by professionals.

The need to disseminate proper and effective self-help techniques is evident from its popularity. It is often the "go-to" for individuals who are dealing with difficulties, especially the emotional kind, as there are barriers that prevent the general population from accessing basic mental health care. In India, Recent research by Bhargava and Mor (2024) shows that "about 200 million people are estimated to be living with poor mental health. Eight out of ten not receiving treatment further compounds the problem. Without interventions that together target mental health resilience, reduction, recognition, and recovery, we expect this burden of disease to increase by 35 percent…" (p.1). The percentage of mental health service workers is approximately 0.3 psychiatrists, 0.07 psychologists and 0.07 social workers per 100,000 people in India (The Economic Times, 2022). Similarly, there are financial, cultural, and social barriers like low affordability, lack of awareness, lack of accessibility and stigma (Andrade et al., 2013).

AI chatbots can bridge this gap between the general population and mental health professionals by providing evidence-based self-help and management techniques under many of its features, such as usability, personalisation capacity, acceptability, scalability, free-flowing conversations, and non-judgemental space (Aggarwal et al., 2023). As chatbots can be easily integrated into popular SNS platforms, They offer an immediate and less intimidating avenue for support. This is shown in the research of (Kamita et al., 2018), where they used LINE, a popular chat tool in Japan, to test their digital-SAT method through the chatbot.

Evidence of Effectiveness of Chatbots in the Context of Self-help

Multiple sources have found that digital predecessors to AI chatbots, such as computer-assisted therapy, smartphone apps, and wearable technologies, effectively aid mental health issues. The general mechanism of change these interventions follow is providing users with worksheets, self-reflective questions based on psychological theories, mood, habits and stress monitoring, and journaling. In a systematic meta-review (Hollis et al., 2017), multiple digital health interventions were looked at in children and adolescents. For depressive symptoms, some of these were positively associated with improvements in outcomes compared to waitlist and no intervention controls.

Project CATCH-IT incorporated behavioural activation, CBT, interpersonal psychotherapy, and a community resiliency concept model. 6 weeks post-intervention, the improvements were sustained and increased in both intervention groups at one-year follow-up for Project CATCH-IT.

PratenOnline delivered one-to-one chat room-based Solution-Focused Brief Therapy (SFBT). Over a quarter of young people receiving PratenOnline maintained clinically significant change at 4.5-month follow-up, compared to waitlist controls. Additionally, adolescents who used StressBusters (using cCBT theoretical base) reported improvements in depression and anxiety from post-intervention to 3-month follow-up. A multi-theoretical online intervention, Bounce Back Now for adolescents affected by natural disasters, resulted in improvements in PTSD and depressive symptoms at 12-month follow-up. Another systematic review and meta-analysis (Grist et al., 2018) found that technology-based interventions had a small positive impact compared to waitlist controls. Cognitive Behavioral Therapy (CBT) interventions showed a medium impact, while Attention Bias Modification (ABM) interventions had a negligible impact.

Regarding AI chatbots, these above-mentioned interventions can be incorporated easily because of AI's open and generative nature. Because of its relational and conversational capacity, more can be done when it comes to rapport building (Zhang et al., 2020), even across different cultures (Chin et al., 2023). Evidence of this has been shown across multiple fields that can arguably come under self-help: lifestyle changes, habit building, learning better, and managing addiction, depression and anxiety symptoms.

Management of Mental Health Issues. In a randomised controlled trial, the participants were randomly assigned to either a chatbot test group to receive a newly developed chatbot-delivered intervention or a bibliotherapy control group to receive a minimal level of bibliotherapy for symptoms of anxiety and depression. After the treatment, individuals belonging to the chatbot group showed a significant

reduction in scores in questionnaires that measured general health and anxiety levels (PHQ-9 and GAD-7). Follow-up analysis suggested that the reduction of anxiety was significant only in the first four weeks (Liu et al., 2021). In their paper, which talked about the overview of freely available chatbots, Haque and Rubya (2023) mention how they have great potential to offer social and psychological support in situations where no support is available. This study involved apps like Woebot, Wysa, Youper, Stresscoach, and Serenity, which targeted Stress, anxiety, depression, self-care, relationship issues, and loneliness and provided access to self-care tools to users 24/7. Kamita et al. (2018) also suggest that Woebot, as part of an evaluation experiment, decreased depressive symptoms in students significantly. Text-based chatbots like ELIZA and MYLO led to emotional relief of anxiety, stress, and pain in general, Although MYLO focused more on problem-solving. In their subsequent studies, it was observed that in a two-week comparative study between the self-guided mental healthcare systems with and without a chatbot, the system with a chatbot showed higher stress reduction effects and continuity of use. The chatbot had the SAT counselling method integrated, created by Munakata (Kamita et al., 2020).

Lifestyle Changes. Multiple studies have found that AI chatbots were efficacious in promoting healthy lifestyles, including physical exercise and diet, smoking cessation, treatment or medication adherence, and reduction in substance misuse. In a study by Piao et al. (2020), the Healthy Lifestyle Coaching Chatbot program delivered through KakaoTalk (a popular messenger service in South Korea) resulted in effective habit formation for stair-climbing behaviour. Compared to the baseline, The participants's habit strength scores were positively impacted after four weeks of the intervention on the Self Rating Habit Index (SRHI).

A systematic review and meta-analysis by Singh et al. (2023) found that chatbots aided in significant lifestyle changes. Specifically, chatbots led to an extra 735 steps per day, one additional serving of fruit and vegetables, and an additional 45 minutes of sleep per night. They also found that text-based chatbots are more effective than speech or voice-based AI, which suggests that, at least for the time being, text-based communication is more conducive to achieving positive outcomes in health-related interventions. Further evidence of physical activity and diet programs can be seen in the study by Maher et al. (2020), where a virtual assistant-led lifestyle change program, driven by Chatbot Paola, was both doable and led to noticeable improvements in physical activity, diet, and body composition after 12 weeks. In the area of weight management, Tess, the behavioural coaching chatbot, has been successfully implemented to help support teens in a weight management program and can expand further (Stephens et al., 2019).

In the context of health intervention, CoachAI is a chatbot designed to help with creating and providing health programs for individuals or groups. It sends health activities regularly, like daily or weekly, or at times chosen by the coach. The one-

month pilot study done by Fadhil et al. (2019) showed that users were satisfied with the bot, trusted it greatly, and were comfortable sharing personal details, like their stress levels. This suggests that using a conversational agent to support individuals who want to improve their lives is possible. However, the choice between using a virtual agent, a human agent, or a mix depends on the specific health context.

In the study by Prochaska et al. (2021) Woebot shows a promising impact when it comes to handling substance use. During an eight-week program, participants engaged with the app extensively, especially with modules on COVID-19, urge surfing, and substance use labels. Mood and craving ratings decreased significantly, while pain ratings remained stable. Among retained participants, confidence in resisting substance use increased significantly, and self-reported substance use decreased. Most participants would recommend the app, although less than half felt it met all their needs. Similarly, Participants in the study by Chun-Hung et al. (2023) had favourable acceptance and generally positive outcomes related to interventions for Methamphetamine usage. For smoking cessation, evidence of motivational interviewing (MI) working through chatbot has been found in the study by Brown et al. (2023). Using generative reflections of the MIbot boosts the conversation's impact on quitting smoking a week later, but asking questions alone can also have a significant effect. This suggests the need to improve the chatbot dialogue and provides a basis for comparing it with more advanced versions.

Overall, AI chatbots as tools to aid self-help efforts show great promise with its interventions for emotional problems being acceptable, engaging and with high usability (Balan et al., 2024). Although it is not without limitations, Users across studies have reported a lack of personal connection with chatbots, poor smartphone skills among the participants, impractical recommendations by the chatbot, and technical challenges such as those where the participants stopped receiving the chatbot messages. Users are greatly influenced by the quality of the relationship between humans and AI, how engaged they are with the content, and how effectively the content is communicated. This is still in the process of improvement when it comes to AI technology (Li et al., 2023). Meta-analyses have also found that guided or chatbots, which are already integrated or adjunct with a mental health professional, work better (Gellatly et al., 2007). Another major problem that remains is non-compliance or falling out of the program (Gould & Clum, 1993). Nevertheless, the majority of the research done in this area have a similar optimistic view- that it is indeed possible to use AI chatbots to aid self-help efforts for the general population and reach numbers that are not possible by the current physical resources.

CHATBOTS AS A TOOL FOR THERAPIST MATCHING

Why is it important to match with the right kind of therapist?

The client-counsellor relationship is perhaps the most important part of the healing process in therapy. The right fit can make the difference between therapy being positive, empowering, or frustratingly unproductive. When the user works with a therapist who is suitable for them and their needs, they create an alliance that can foster personal growth, improve their coping skills, and significantly improve the user's ability to deal with the challenges that brought them to therapy in the first place (France, 2016).

The question remains: how does the user know which therapist is right for them? Traditionally, this decision is made by asking for referrals from close ones, researching therapists nearby, contacting different therapists that we might be interested in and interviewing them, and looking for the therapist's professional orientationist and their education and licensure.

Even doing all these things does not lead to a therapist that matches with the personality. As personality is very subjective, there needs to be a fit and balance between one's personality and the potential therapist's personality for it to be an excellent therapeutic alliance. For instance, when an extremely introverted user meets an extroverted therapist, the therapist might not necessarily comprehend what it means to be in the shoes of an introverted individual. This does not negate their professional capabilities. However, if you, the user, are significantly different in their disposition and have a high someone who requires a sense of being heard, understood and nurtured, their clinical style might simply not align with your needs. Often, this intangible yet crucial factor can only be adequately assessed through an in-person interaction.

Moreover, this is where AI-driven therapist matching can be transformative. AI-driven therapist matching can simplify this process as the AI analyses your traits, preferences, and overall persona to highlight therapists who are predicted to be highly compatible fits. This personalised approach allows users to choose from a curated pool of professionals, ensuring compatibility and increasing the likelihood of a successful treatment relationship. A good client-clinician fit promises to lead to a better therapeutic alliance, better client functioning, reliable reductions in depressive symptoms, and positive change in many other client outcomes (Peacock et al., 2021).

In addition, this system not only saves users valuable time but also offers flexibility. If the user finds that the initial match is not quite right, they can explore other available therapists without starting the entire search process. This flexibility encourages users to try different matches until they find one that suits their needs.

In addition, users can provide feedback and additional information about their preferences and experiences, allowing the AI system to continuously refine its recommendations. This iterative process ensures that recommendations are adjusted over time, leading to more effective matches and, ultimately, better treatment outcomes.

How Chatbots can Match Client-Therapist using NLP and AI

Chatbots use natural language processing (NLP) and artificial intelligence (AI) to interact with users. The use of NLP techniques helps to analyse and understand the meaning of user inputs based on text. Research also shows that there is an upward trend in the detection of mental disorders using NLP (Zhang, 2022). By understanding the user's question or statement, the bot can formulate an appropriate response.

The chatbot recognises intention by applying NLU mechanisms to recognise user intents based on their input. This can involve categorising user queries into predefined categories or actions, analysing semantic patterns, extracting entities, and understanding context, allowing the chatbot to determine the user's purpose or goal. Intent recognition is essential for directing the conversation flow and providing relevant assistance to users.

Natural language processing can be used to develop conversational agents used for therapeutic intervention (D'Alfonso, 2020). They use contextual understanding techniques to remember previous interactions, user preferences, and relevant information exchanged during the conversation to ensure coherence and relevance in their responses. This allows chatbots to provide personalised and contextual responses, improving the user experience.

After understanding user intent and context, chatbots generate natural-sounding responses using natural language generation (NLG) techniques. NLG involves synthesising human-like language based on predefined patterns, rules or by using GenAI models. By generating consistent and contextual responses, chatbots can engage users in meaningful conversation and provide valuable help or information.

Functionality of Chatbots in Therapist Matching

Chatbots play a central role in the initial assessment of users' mental health needs, preferences and demographics by engaging in interactive conversations. This data collection process enables chatbots to personalise therapist recommendations effectively. Leveraging advanced algorithms, chatbots facilitate algorithmic matching between users and therapists, considering factors such as specialisation, location, availability, and treatment approach. This ensures precise and tailored matches,

enhancing the overall user experience. Additionally, Chatbots are highly usable due to their simple interface and conversation-driven functionality (Holmes, 2019).

In addition, mental health chatbots are valuable resources that provide users with comprehensive information about therapists, including their credentials, specialities, availability, and session formats. This can help the user feel empowered to make informed decisions about their treatment options. Additionally, mental health chatbots can streamline the appointment process by seamlessly integrating with calendars and providing automatic booking tools. Users can easily view available appointments, select desired appointments and receive reminders, promoting greater engagement with therapy services.

In terms of efficiency, mental health chatbots excel at quickly assessing user needs and preferences, thus streamlining the therapist-matching process. This process saves considerable time compared to traditional methods, such as searching through directories or waiting for human assistance. Research has also shown that chatbots are an acceptable solution to offering mental health support (Koulouri, 2022).

Lastly, chatbots offer scalability benefits by efficiently handling many inquiries simultaneously. This scalability makes them well-suited for platforms serving diverse user bases, as they can adapt to growing demand without requiring additional resources. Overall, chatbots are a valuable asset in mental health services, offering efficiency, scalability, and personalised support.

Case Study, Therapist Matching: Healo, an Initiative by Infiheal

Infiheal's Healo Chatbot has attempted a novel approach to mental health support. Healo AI coach provides emotional guidance and provides psychoeducation to users. A significant point of difference is utilising conversational data for therapist-matching based on personality types. Healo uses advanced algorithms to create personalised connections between clients and therapists. Furthermore, it delves into the user's specific concerns, preferred communication style, desired therapeutic approach, and personality type to find the best fit.

On the therapist side, it considers things like therapeutic modalities, specialisations, and even the languages spoken. This AI algorithm-based matching aims to streamline the challenging process of finding the right therapist. By prioritising compatibility, Healo hopes to increase client satisfaction and, ultimately, improve overall therapeutic outcomes.

MENTAL HEALTH CHATBOTS: THE WAY FORWARD

Mental health chatbots are constantly evolving, and addressing their current limitations is a priority. One development problem is the capacity for crisis intervention. Future chatbots could be equipped with algorithms that detect signs of acute psychological distress or suicidal thoughts and respond with appropriate crisis advice or connect the user to emergency services.

The rapidly increasing research on chatbots in the field of clinical psychology and psychotherapy requires corrective measures. Issues like effectiveness, sustainability, and especially safety and subsequent tests of technology are elements that should be instituted as a corrective for future funding programs of chatbots in clinical psychology and psychotherapy (Bendig et al., 2019). Accessibility is another area that can be improved. Next-generation chatbots should provide disabled multimodal user interfaces such as voice control, screen readers or even haptic feedback for visually/hearing impaired users.

The inclusion of different regional languages can also make it easier. The linguistic capabilities of the chatbots have to be able to deal adequately with unexpected user input, provide high-quality responses, and show high variability in responses. To be useful for clinical practice, we have to find ways to harmonise chatbot content with individual treatment recommendations; that is, a personalisation of chatbot conversations is required (Abd-Alrazaq, 2021).

Chatbots can implement controls that limit over-use and instead encourage the augmentation of conversational AI with humans to address issues of over-reliance or technology dependency. Smart instructions can remind users that chat is not a substitute for professional mental health support. Ultimately, interdisciplinary, human-centred design that synthesises the perspectives of psychologists, clinicians, technologists, and end users is essential to unlocking the full transformative potential of mental health chatbots.

CONCLUSION

In conclusion, it is paramount that we remain steadfast in our goal of improving the quality of mental health care in the digital frontier. However, there are numerous advantages that come with mental health chatbots, as previously discussed in this chapter, like accessibility, affordability, and free from bias. However, if not trained properly, it can raise a variety of ethical concerns that might exacerbate or cause more harm to individuals experiencing mental health concerns. Hence, ethical considerations should be strictly addressed at every stage of developing and utilising this technology. Thus, by carefully understanding the nature and scope of AI around the

REFERENCES

Abd-Alrazaq, A. A., Alajlani, M., Ali, N., Denecke, K., Bewick, B. M., & Househ, M. (2021). Perceptions and opinions of patients about mental health chatbots: Scoping review. *Journal of Medical Internet Research*. *Journal of Medical Internet Research*, 23(1), e17828. DOI: 10.2196/17828 PMID: 33439133

Aggarwal, A., Tam, C. C., Wu, D., Li, X., & Qiao, S. (2023). Artificial intelligence–based chatbots for promoting health behavioral changes: Systematic review. *Journal of Medical Internet Research*, 25(1), e40789. DOI: 10.2196/40789 PMID: 36826990

Ahmed, A., Hassan, A., Aziz, S., Abd-Alrazaq, A. A., Ali, N., Alzubaidi, M., Al-Thani, D., Elhusein, B., Siddig, M. A., Ahmed, M., & Househ, M. (2023). Chatbot features for anxiety and depression: A scoping review. *Health Informatics Journal*, 29(1). Advance online publication. DOI: 10.1177/14604582221146719 PMID: 36693014

Anderson, C. M., Hogarty, G. E., & Reiss, D. J. (1980). Family treatment of adult schizophrenic patients: A psycho-educational approach. *Schizophrenia Bulletin*, 6(3), 490–505. DOI: 10.1093/schbul/6.3.490 PMID: 7403810

Andrade, L. H., Alonso, J., Mneimneh, Z., Wells, J. E., Al-Hamzawi, A., Borges, G., Bromet, E., Bruffaerts, R., de Girolamo, G., de Graaf, R., Florescu, S., Gureje, O., Hinkov, H. R., Hu, C., Huang, Y., Hwang, I., Jin, R., Karam, E. G., Kovess-Masfety, V., & Kessler, R. C. (2013). Barriers to mental health treatment: Results from the WHO World Mental Health (WMH) surveys. *Psychological Medicine*, 44(6), 1303–1317. DOI: 10.1017/S0033291713001943 PMID: 23931656

Andrade-Arenas, L., Yactayo-Arias, C., & Pucuhuayla-Revatta, F. (2024). therapy and emotional support through a chatbot. *International Journal of Online and Biomedical Engineering*, 20(2), 114–130. DOI: 10.3991/ijoe.v20i02.45377

Balan, R., Dobrean, A., & Poetar, C. R. (2024). Use of automated conversational agents in improving young population mental health: A scoping review. *NPJ Digital Medicine*, 7(1), 1–9. DOI: 10.1038/s41746-024-01072-1 PMID: 38503909

Bao, R., Zhang, A., & Li, S. (2020). COVID-19 pandemic and intrahepatic cholestasis of pregnancy: A case report. *BMC Pregnancy and Childbirth*, 20(1), 1–3. https://www.ncbi.nlm.nih.gov/pmc/articles/PMC7256567/

Bendig, E., Erb, B., Schulze-Thuesing, L., & Baumeister, H. (2022). The next generation: Chatbots in clinical psychology and psychotherapy to foster mental health – a scoping review. *Verhaltenstherapie*, 32(1, Suppl. 1), 64–76. DOI: 10.1159/000501812

Bennett, S., Cuijpers, P., Ebert, D., McKenzie, M., Coughtrey, A., Heyman, I., Manzotti, G., & Shafran, R. (2019). Practitioner review: Unguided and guided self-help interventions for common mental health disorders in children and adolescents: A systematic review and meta-analysis. *Journal of Child Psychology and Psychiatry, and Allied Disciplines*, 60(8), 828–847. DOI: 10.1111/jcpp.13010 PMID: 30775782

Bezerra, A. C. V., de Mendonça, R. D., Lamborda, T. C., & César, C. L. G. (2018). Trends in prevalence of overweight and obesity in adults in 26 Brazilian state capitals and the Federal District from 2006 to 2016. *BMC Public Health*, 18(1), 1–10. DOI: 10.1186/s12889-018-5235-x

Bhargava, I., & Mor, N. (2024, February 15). *The future of mental health: Emerging trends and innovations.* Economics Times. https://health.economictimes.indiatimes.com/news/industry/the-future-of-mental-health-emerging-trends-and-innovations/107673809

Biringer, E., Davidson, L., Sundfør, B., Lier, H. Ø., & Borg, M. (2016). Coping with mental health issues: Subjective experiences of self-help and helpful contextual factors at the start of mental health treatment. *Journal of Mental Health (Abingdon, England)*, 25(1), 23–27. DOI: 10.3109/09638237.2015.1078883 PMID: 26484831

Boucher, E. M., Harake, N. R., Ward, H. E., Stoeckl, S. E., Vargas, J., Minkel, J., Parks, A. C., & Zilca, R. (2021). Artificially intelligent chatbots in digital mental health interventions: a review. *Expert Review of Medical Devices, 18*(sup1), 37–49. DOI: 10.1080/17434440.2021.2013200

Brown, A., Kumar, A. T., Melamed, O., Ahmed, I., Wang, Y. H., Deza, A., Morcos, M., Zhu, L., Maslej, M., Minian, N., Sujaya, V., Wolff, J., Doggett, O., Iantorno, M., Ratto, M., Selby, P., & Rose, J. (2023). A motivational interviewing chatbot with generative reflections for increasing readiness to quit smoking: Iterative development study. *JMIR Mental Health*, 10(1), e49132. DOI: 10.2196/49132 PMID: 37847539

Chang, S., Sambasivam, R., Seow, E., Tan, G. C.-Y., Lu, S. H., Assudani, H., Chong, S. A., Subramaniam, M., & Vaingankar, J. A. (2021). "We are all trying to find a way to help ourselves": A look at self-help strategies among psychotherapy clients. *Frontiers in Psychology*, 12, 621085. Advance online publication. DOI: 10.3389/fpsyg.2021.621085 PMID: 34690850

Chen, Y., Lin, Q., Chen, X., Liu, T., Ke, Q., Yang, Q., Guan, B., & Ming, W. K. (2023). Need assessment for history-taking instruction program using chatbot for nursing students: A qualitative study using focus group interviews. *Digital Health*, 29(9), 20552076231185435. DOI: 10.1177/20552076231185435 PMID: 37426591

Chin, H., Song, H., Baek, G., Shin, M., Jung, C., Cha, M., Choi, J., & Cha, C. (2023). The potential of chatbots for emotional support and promoting mental well-being in different cultures: Mixed methods study. *Journal of Medical Internet Research*, 25, e51712. Advance online publication. DOI: 10.2196/51712 PMID: 37862063

Chun-Hung, L., Guan-Hsiung, L., Wu-Chuan, Y., & Yu-Hsin, L. (2023). Chatbot-assisted therapy for patients with methamphetamine use disorder: A preliminary randomized controlled trial. *Frontiers in Psychiatry*, 14, 1159399. Advance online publication. DOI: 10.3389/fpsyt.2023.1159399 PMID: 37484677

Co, M., Yuen, T. H. J., & Cheung, B. H. H. (2022). Using clinical history taking chatbot mobile app for clinical bedside teachings – A prospective case control study. *Heliyon*, 8(6), e09751. DOI: 10.1016/j.heliyon.2022.e09751 PMID: 35770149

Codecademy. (n.d.). *What are chatbots?*https://www.codecademy.com/article/what-are-chatbots

D'Alfonso, S. (2020). AI in mental health. *Current Opinion in Psychology*, 36, 112–117. DOI: 10.1016/j.copsyc.2020.04.005 PMID: 32604065

Dev, P., Winzelberg, A. J., Celio, A., & Taylor, C. B. (1999). Student bodies: Psycho-education communities on the web. *Proc AMIA Symp*, 510–514. PMID: 10566411

Ettman, C. K., & Galea, S. (2023). The potential influence of AI on population mental health. *JMIR Mental Health*, 10, e49936. DOI: 10.2196/49936 PMID: 37971803

Fadhil, A., Wang, Y., & Reiterer, H. (2019). Assistive conversational agent for health coaching: A validation study. *Methods of Information in Medicine, 58*(1), 9–23. DOI: 10.1055/s-0039-1688757

Flora, K., Raftopoulos, A., & Pontikes, T. (2010). A look at the evolution of the self-help movement. *Journal of Groups in Addiction & Recovery*, 5(3-4), 214–225. DOI: 10.1080/1556035X.2010.523349

France, B. (2016, November 23). *The importance of choosing the right therapist.* Medium. https://medium.com/@BenFrance/the-importance-of-choosing-the-right-therapist-5622d4f22a13

Frey, B. (2024, March 27). *Earkick: AI-powered mental health support.* Earkick. https://blog.earkick.com/earkick-ai-powered-mental-health-support/

Fusar-Poli, P., De Pablo, G. S., De Micheli, A., Nieman, D. H., Correll, C. U., Kessing, L. V., Pfennig, A., Bechdolf, A., Borgwardt, S., Arango, C., & van Amelsvoort, T. (2020). What is good mental health? A scoping review. *European Neuropsychopharmacology*, 31, 33–46. DOI: 10.1016/j.euroneuro.2019.12.105 PMID: 31901337

Gellatly, J., Bower, P., Hennessy, S., Richards, D., Gilbody, S., & Lovell, K. (2007). What makes self-help interventions effective in the management of depressive symptoms? Meta-analysis and meta-regression. *Psychological Medicine*, 37(9), 1217–1228. DOI: 10.1017/S0033291707000062 PMID: 17306044

Goodwin, G., Haddad, P., Ferrier, I., Aronson, J. K., Barnes, T. R. H., Cipriani, A., Coghill, D. R., Fazel, S., Geddes, J. R., Grunze, H., Holmes, E. A., Howes, O., Hudson, S., Hunt, N., Jones, I., Macmillan, I. C., McAllister-Williams, H., Miklowitz, D. R., Morriss, R., & Young, A. H. (2016). *Evidence-based guidelines for treating bipolar disorder*: Revised third edition recommendations from the British Association for Psychopharmacology. *Journal of Psychopharmacology, 30*(6), 495-553. DOI: 10.1177/0269881116636545

Gould, R., & Clum, G. (1993). A meta-analysis of self-help treatment approaches. *Clinical Psychology Review*, 13(2), 169–186. DOI: 10.1016/0272-7358(93)90039-O

Grist, R., Croker, A., Denne, M., & Stallard, P. (2018). Technology delivered interventions for depression and anxiety in children and adolescents: A systematic review and meta-analysis. *Clinical Child and Family Psychology Review*, 22(2), 147–171. DOI: 10.1007/s10567-018-0271-8 PMID: 30229343

Gupta, T. (2023, October 26). *The role of generative AI in natural language processing*. eLearning Industry. https://elearningindustry.com/role-of-generative-ai-in-natural-language-processing#:~:text=In%20the%20context%20of%20Natural,Pre%2Dtrained%20Transformer)%20series.

Haque, M. D. R., & Rubya, S. (2023). An overview of chatbot-based mobile mental health apps: Insights from app description and user reviews. *JMIR mHealth and uHealth*, 11, e44838. DOI: 10.2196/44838 PMID: 37213181

Herrera, S. N., Sarac, C., Phili, A., Gorman, J., Martin, L., Lyallpuri, R., Dobbs, M. F., DeLuca, J. S., Mueser, K. T., Wyka, K. E., Yang, L. H., Landa, Y., & Corcoran, C. M. (2023). Psychoeducation for individuals at clinical high risk for psychosis: A scoping review. *Schizophrenia Research*, 252, 148–158. DOI: 10.1016/j.schres.2023.01.008 PMID: 36652831

Hollis, C., Falconer, C. J., Martin, J., Whittington, C., Stockton, S., Glazebrook, C., & Davies, E. B. (2017). Annual research review: Digital health interventions for children and young people with mental health problems – a systematic and meta-review. *Journal of Child Psychology and Psychiatry, and Allied Disciplines*, 58(4), 474–503. DOI: 10.1111/jcpp.12663 PMID: 27943285

Holmes, S., Moorhead, A., Bond, R., Zheng, H., Coates, V., & Mctear, M. (2019). Usability testing of a healthcare chatbot: Can we use conventional methods to assess conversational user interfaces? *Proceedings of the 31st European Conference on Cognitive Ergonomics - ECCE 2019.* DOI: 10.1145/3335082.3335094

IBM. (n.d.). *What is a chatbot?*https://www.ibm.com/topics/chatbots

Intelliverse.ai. (2023, September 12). *How AI is making mental healthcare more accessible.* LinkedIn. https://www.linkedin.com/pulse/how-ai-making-mental-healthcare-more-accessible/

Jang, S., Kim, J.-J., Kim, S.-J., Hong, J., Kim, S., & Kim, E. (2021). Mobile app-based chatbot to deliver cognitive behavioral therapy and psychoeducation for adults with attention deficit: A development and feasibility/usability study. *International Journal of Medical Informatics*, 150, 104440. DOI: 10.1016/j.ijmedinf.2021.104440 PMID: 33799055

Jorm, A. F., & Griffiths, K. M. (2006). Population promotion of informal self-help strategies for early intervention against depression and anxiety. *Psychological Medicine*, 36(1), 3–6. DOI: 10.1017/S0033291705005659 PMID: 16356291

Kamita, T., Ito, T., Matsumoto, A., Munakata, T., & Inoue, T. (2018). A chatbot system for mental healthcare based on SAT counseling method. *Mobile Information Systems,* 9517321:1-9517321:11. DOI: 10.1155/2019/9517321

Kamita, T., Matsumoto, A., Sun, B., & Inoue, T. (2020). Promotion of continuous use of a self-guided mental healthcare system by a chatbot. *Companion Publication of the 2020 Conference on Computer Supported Cooperative Work and Social Computing,* 293–298. DOI: 10.1145/3406865.3418343

Klainin-Yobas, P., Ng, S. H., Stephen, P. D. M., & Lau, Y. (2016). Efficacy of psychosocial interventions on psychological outcomes among people with cardiovascular diseases: A systematic review and meta-analysis. *Patient Education and Counseling*, 99(4), 512–521. DOI: 10.1016/j.pec.2015.10.020 PMID: 27045976

Koulouri, T., Macredie, R. D., & Olakitan, D. (2022). Chatbots to support young adults' mental health: An exploratory study of acceptability. *ACM Transactions on Interactive Intelligent Systems*, 12(2), 1–39. DOI: 10.1145/3485874

Kulkarni, R., & Jaiswal, R. C. (2023). A survey on AI chatbots. *International Journal for Research in Applied Science and Engineering Technology*, 11(9), 1738–1744. DOI: 10.22214/ijraset.2023.55911

Li, H., Zhang, R., Lee, Y.-C., Kraut, R. E., & Mohr, D. C. (2023). Systematic review and meta-analysis of AI-based conversational agents for promoting mental health and well-being. *NPJ Digital Medicine*, 6(1), 1. Advance online publication. DOI: 10.1038/s41746-023-00979-5 PMID: 38114588

Liu, H., Peng, H., Song, X., Xu, C., & Zhang, M. (2021). Using AI chatbots to provide self-help depression interventions for university students: A randomized trial of effectiveness. *Internet Interventions : the Application of Information Technology in Mental and Behavioural Health*, 27, 100495. DOI: 10.1016/j.invent.2022.100495 PMID: 35059305

Lukens, E. P., & McFarlane, W. R. (2006). Psychoeducation as evidence-based practice: Considerations for practice, research, and policy. In Roberts, A. R., & Yeager, K. R. (Eds.), *Foundations of evidence-based social work practice* (pp. 291–313). Oxford University Press. DOI: 10.1093/oso/9780195305944.003.0022

Maher, C. A., Davis, C. R., Curtis, R. G., Short, C. E., & Murphy, K. J. (2020). A physical activity and diet program delivered by artificially intelligent virtual health coach: Proof-of-concept study. *JMIR mHealth and uHealth*, 8(7), e17558. DOI: 10.2196/17558 PMID: 32673246

Mains, J. A., & Scogin, F. R. (2003). The effectiveness of self-administered treatments: A practice-friendly review of the research. *Journal of Clinical Psychology*, 59(2), 237–246. DOI: 10.1002/jclp.10145 PMID: 12552632

Math, S. B., Gowda, G. S., Basavaraju, V., Manjunatha, N., Kumar, C. N., Enara, A., Gowda, M., & Thirthalli, J. (2019). Cost estimation for the implementation of the Mental Healthcare Act 2017. *Indian Journal of Psychiatry*, 61(10, Suppl 4), S650–S659. DOI: 10.4103/psychiatry.IndianJPsychiatry_188_19 PMID: 31040453

McGorry, P. D., Nelson, B., Goldstone, S., & Yung, A. R. (2010). Clinical staging: A heuristic and practical strategy for new research and better health and social outcomes for psychotic and related mood disorders. *Canadian Journal of Psychiatry*, 55(8), 486–497. DOI: 10.1177/070674371005500803 PMID: 20723276

Meghrajani, V. R., Marathe, M., Sharma, R., Potdukhe, A., Wanjari, M. B., & Taksande, A. B. (2023). A comprehensive analysis of mental health problems in India and the role of mental asylums. *Cureus*, 15(7), e42559. DOI: 10.7759/cureus.42559 PMID: 37637646

Meskó, B. (2023, August 10). *Top 10 health chatbots.* LinkedIn. https://www.linkedin.com/pulse/top-10-health-chatbots-bertalan-mesk%C3%B3-md-phd/

Moghimi, E., Stephenson, C., Gutierrez, G., Jagayat, J., Layzell, G., Patel, C., McCart, A., Gibney, C., Langstaff, C., Ayonrinde, O., Khalid-Khan, S., Milev, R., Snelgrove-Clarke, E., Soares, C., Omrani, M., & Alavi, N. (2023). Mental health challenges, treatment experiences, and care needs of post-secondary students: A cross-sectional mixed-methods study. *BMC Public Health*, 23(1), 655. DOI: 10.1186/s12889-023-15452-x PMID: 37020282

Monash University. (2021, March 19). *All you need is Ash: Chatbot designed to boost teen mental health at school.*https://www.monash.edu/news/articles/all-you-need-is-ash-chatbot-designed-to-boost-teen-mental-health-at-school

Motlova, L. B., Balon, R., Beresin, E. V., Brenner, A. M., Coverdale, J. H., Guerrero, A. P. S., Louie, A. K., & Roberts, L. W. (2017). Psychoeducation as an opportunity for patients, psychiatrists, and psychiatric educators: Why do we ignore it? *Academic Psychiatry*, 41(4), 447–451. DOI: 10.1007/s40596-017-0728-y PMID: 28536990

Murthy, R. S. (2017). National Mental Health Survey of India 2015-2016. *Indian Journal of Psychiatry*, 59(1), 21–26. DOI: 10.4103/psychiatry.IndianJPsychiatry_102_17 PMID: 28529357

Niederkrotenthaler, T., Eisenwort, B., Till, B., Sonneck, G., Tran, U. S., & Sonneck, G. (2021). Applying language models for suicide prevention: Evaluating news article adherence to WHO reporting guidelines. *Crisis*. Advance online publication. DOI: 10.1027/0227-5910/a000811

Norcross, J. C. (2000). Here comes the self-help revolution in mental heath. *Psychotherapy (Chicago, Ill.)*, 37(4), 370–377. DOI: 10.1037/0033-3204.37.4.370

Nussey, C., Pistrang, N., & Murphy, T. (2013). How does psychoeducation help? A review of the effects of providing information about Tourette syndrome and attention-deficit/hyperactivity disorder. *Child: Care, Health and Development*, 39(5), 617–627. DOI: 10.1111/cch.12039 PMID: 23461278

Oracle Cloud Infrastructure (OCI). (n.d.). *What is a chatbot?*https://www.oracle.com/in/chatbots/what-is-a-chatbot/

Peacock, S. M., Goodwin, I. H., Wood, R. K., McBride, C. J., Brock, A. C., Erekson, D. M., & Boyd, Z. M. (2021). *MATCH: Client-therapist matching with machine learning*. Brigham Young University.

Perrone, M. (2024, March 23). *Ready or not, AI chatbots are here to help with Gen Z's mental health struggles.* AP News. https://apnews.com/article/chatbots-mental-health-therapy-counseling-ai-73feb819ff52a51d53fee117c3207219

Piao, M., Ryu, H., Lee, H., & Kim, J. (2020). Use of the healthy lifestyle coaching chatbot app to promote stair-climbing habits among office workers: Exploratory randomized controlled trial. *JMIR mHealth and uHealth*, 8(5), e15085. DOI: 10.2196/15085 PMID: 32427114

Prochaska, J. J., Vogel, E. A., Chieng, A., Kendra, M., Baiocchi, M., Pajarito, S., & Robinson, A. (2021). A therapeutic relational agent for reducing problematic substance use (Woebot): Development and usability study. *Journal of Medical Internet Research*, 23(3), e24850. DOI: 10.2196/24850 PMID: 33755028

Robards, F., Kang, M., Luscombe, G., Hawke, C., Sanci, L., Steinbeck, K., Zwi, K., Towns, S., & Usherwood, T. (2020). Intersectionality: Social marginalisation and self-reported health status in young people. *International Journal of Environmental Research and Public Health*, 17(21), 8104. DOI: 10.3390/ijerph17218104 PMID: 33153094

Rosen, G. (1993). Self-help or hype? comments on psychology's failure to advance self-care. *Professional Psychology, Research and Practice*, 24(3), 340–345. DOI: 10.1037/0735-7028.24.3.340

Sachdeva, N. (2023, July 12). *Chatbots as virtual therapists: The future of mental health care*. Daffodil Software Engineering Insights. https://insights.daffodilsw.com/blog/chatbots-the-future-of-mental-health-care

Sarkhel, S., Singh, O. P., & Arora, M. (2020). Clinical practice guidelines for psychoeducation in psychiatric disorders general principles of psychoeducation. *Indian Journal of Psychiatry*, 62(8, Suppl 2), S319–S323. DOI: 10.4103/psychiatry.IndianJPsychiatry_780_19 PMID: 32055073

Selaskowski, B., Reiland, M., Schulze, M., Aslan, B., Kannen, K., Wiebe, A., Wallbaum, T., Boll, S., Lux, S., Philipsen, A., & Braun, N. (2023). Chatbot-supported psychoeducation in adult attention-deficit hyperactivity disorder: Randomised controlled trial. *BJPsych Open*, 9(6), e192. DOI: 10.1192/bjo.2023.573 PMID: 37827996

Shukla, D. (2022, April 20). *Why mental healthcare is less accessible to marginalized communities*. MedicalNewsToday. https://www.medicalnewstoday.com/articles/why-mental-healthcare-is-less-accessible-to-marginalized-communities

Singh, B., Olds, T., Brinsley, J., Dumuid, D., Virgara, R., Matricciani, L., Watson, A., Szeto, K., Eglitis, E., Miatke, A., Simpson, C. E. M., Vandelanotte, C., & Maher, C. (2023). Systematic review and meta-analysis of the effectiveness of chatbots on lifestyle behaviours. *NPJ Digital Medicine*, 6(1), 1–10. DOI: 10.1038/s41746-023-00856-1 PMID: 37353578

Singh, O. P. (2019). Chatbots in psychiatry: Can treatment gap be lessened for psychiatric disorders in India. *Indian Journal of Psychiatry*, 61(3), 225. DOI: 10.4103/0019-5545.258323 PMID: 31142896

Skjuve, M. B., & Brandtzæg, P. B. (2017). Chatbots as a new user interface for providing health information to young people. In Andersson, Y., Dahlquist, U., & Ohlsson, J. (Eds.), *Youth and news in a digital media environment – Nordic-Baltic perspectives*. Nordicom.

Stephens, T. N., Joerin, A., Rauws, M., & Werk, L. N. (2019). Feasibility of pediatric obesity and prediabetes treatment support through Tess, the AI behavioral coaching chatbot. *Translational Behavioral Medicine*, 9(3), 440–447. DOI: 10.1093/tbm/ibz043 PMID: 31094445

Talaviya, A. (2023, November 6). *Machine learning algorithms used in creating AI chatbots.* Medium. https://medium.com/@avikumart_/machine-learning-algorithms-used-in-creating-ai-chatbots-3bac9fe27cb9

Thapa, R., van Teijlingen, E., Regmi, P. R., & Heaslip, V. (2021). Caste exclusion and health discrimination in South Asia: A systematic review. *Asia-Pacific Journal of Public Health*, 33(8), 828–838. DOI: 10.1177/10105395211014648 PMID: 34024157

The Economic Times. (2022, October 10). *World Mental Health Day: 60-70 mn people in India suffer from common mental disorders; stigmatisation, financial barriers prevent timely treatment.* https://economictimes.indiatimes.com/magazines/panache/world-mental-health-day-60-70-mn-people-in-india-suffer-from-common-mental-disorders-stigmatisation-financial-barriers-prevent-timely-treatment/articleshow/104289268.cms?from=mdr

Town, R., Hayes, D., March, A., Fonagy, P., & Stapley, E. (2023). Self-management, self-care, and self-help in adolescents with emotional problems: A scoping review. *European Child & Adolescent Psychiatry*, ●●●, 1–28. DOI: 10.1007/s00787-022-02134-z PMID: 36641785

Vaidyam, A. N., Wisniewski, H., Halamka, J. D., Kashavan, M. S., & Torous, J. B. (2019). Chatbots and conversational agents in mental health: A review of the psychiatric landscape. *Canadian Journal of Psychiatry*, 64(7), 456–464. DOI: 10.1177/0706743719828977 PMID: 30897957

Valera, S. (2023, March 8). *Best mood tracker apps.* Verwell Mind. https://www.verywellmind.com/best-mood-tracker-apps-5212922

Viduani, A., Cosenza, V., Araújo, R. M., & Kieling, C. (2023). Chatbots in the field of mental health: Challenges and opportunities. In Passos, I. C., Rabelo-da-Ponte, F. D., & Kapczinski, F. (Eds.), *Digital mental health*. Springer. DOI: 10.1007/978-3-031-10698-9_8

Wainberg, M. L., Scorza, P., Shultz, J. M., Helpman, L., Mootz, J. J., Johnson, K. A., Neria, Y., Bradford, J. E., Oquendo, M. A., & Arbuckle, M. R. (2017). Challenges and opportunities in global mental health: A research-to-practice perspective. *Current Psychiatry Reports*, 19(5), 28. DOI: 10.1007/s11920-017-0780-z PMID: 28425023

Xia, J., Merinder, L. B., & Belgamwar, M. R. (2011). Psychoeducation for schizophrenia. *Cochrane Database of Systematic Reviews*, 15(6), CD002831. Advance online publication. DOI: 10.1002/14651858.CD002831.pub2 PMID: 21678337

XinhuaNet. (2021, July 16). *China launches new space station core module.*http://www.xinhuanet.com/english/2021-07/16/c_1310064630.htm

Youper. (n.d.). *Effectiveness.* Youper. https://www.youper.ai/effectiveness

Yunus, A. P., Masago, Y., Hijioka, Y., & Saito, Y. (2020). Evaluation of PM2.5 exposure and its impact on premature mortality in South and Southeast Asia. *Environmental Research Letters*, 15(7), 074025. Advance online publication. DOI: 10.1088/1748-9326/ab9375

Zhang, J., Oh, Y. J., Lange, P., Yu, Z., & Fukuoka, Y. (2020). Artificial intelligence chatbot behavior change model for designing artificial intelligence chatbots to promote physical activity and a healthy diet: Viewpoint. *Journal of Medical Internet Research*, 22(9), e22845. DOI: 10.2196/22845 PMID: 32996892

Zhang, T., Schoene, A. M., Ji, S., & Ananiadou, S. (2022). Natural language processing applied to mental illness detection: A narrative review. *NPJ Digital Medicine*, 5(1), 46. DOI: 10.1038/s41746-022-00589-7 PMID: 35396451

KEY TERMS AND DEFINITIONS

Care-Receiving Chatbots: Unlike other chatbots that provide helpful strategies, care-receiving chatbots like Vincent share their challenges and ask for advice from the user.

Cognitive-Behaviour Therapy: A type of therapy modality that targets negative schemas and brings about positive changes in the thoughts, feelings, and behaviours of individuals.

Conversational Agents: A conversational agent is any dialogue system that conducts natural language processing (NLP) and responds automatically using human language.

Generative Artificial Intelligence: Generative artificial intelligence (AI) models are AI platforms that generate a variety of outputs based on massive training datasets, neural networks, deep learning architecture, and prompts from users.

Habit Building: A process through which a sequence of behaviours becomes routine.

Psychoeducation: The process of providing information to the client and family to elicit their support in working with the mental health professional.

Self-Help: Any strategy or technique that an individual applies to deal with emotional or physical distress.

Self-Management: The process through which one manages and regulates their emotions and thought patterns.

Stress Reduction: The process or a set of techniques which reduces the everyday stress an individual might feel.