IJTI | INTERNATIONAL JOURNAL OF THERAPEUTIC INNOVATION

Review article

The role of AI Chatbots in providing mental health support: emotional perception, human-AI interaction, and ethical implications

Shilpa Rawat*

Akal University, Talwandi Sabo, Punjab, India

Corresponding author: Shilpa Rawat, ✉ shilparawat9898@gmail.com, **Orcid Id**: https://orcid.org/ 0009-0008-4386-0170

Received - 09-01-2025**, Revised** - 28-02-2025, **Accepted** - 02-04-2025 **(DD-MM-YYYY)**

Refer this article

Shilpa Rawat, The role of AI Chabot's in providing mental health support: emotional perception, human-AI interaction, and ethical implications. March-April 2025, V3 – I2, Pages - 11 – 20. Doi: https://doi.org/10.55522/ijti.v3i2.0096.

ABSTRACT

This study investigates the role of AI chatbots in providing mental health support, focusing on emotional perception, human-AI interaction, and ethical implications. The research aimed to evaluate the effectiveness of AI chatbots in reducing symptoms of depression and anxiety, enhance emotional intelligence, and explore ethical concerns related to data security and emotional dependency. A mixed-methods approach was employed, combining quantitative measures (PHQ-9 for depression, GAD-7 for anxiety, and emotional intelligence assessments) with qualitative data from participant interviews. Results show a significant reduction in depression and anxiety symptoms after a 4-week AI chatbot intervention ($p < 0.05$), with large effect sizes (Cohen's $d = 0.75$ and 0.72 for depression and anxiety, respectively). Additionally, participants demonstrated notable improvements in emotional intelligence, particularly in self-awareness, emotional regulation, and empathy. The qualitative data revealed positive perceptions of AI's emotional support capabilities, though concerns about emotional dependency on chatbots and data privacy were prevalent. These findings suggest that AI chatbots can be effective tools in mental health interventions, but ethical issues must be addressed to ensure safe and beneficial use. The study emphasizes the potential of AI chatbots in enhancing emotional regulation and decision-making, while also highlighting the importance of considering ethical implications for widespread adoption. Future research should focus on refining chatbot capabilities and addressing privacy concerns to enhance user trust and long-term engagement.

Keywords: AI chatbots, mental health, emotional intelligence, depression, anxiety, human-AI interaction, ethical implications.

INTRODUCTION

Mental health disorders, including depression, anxiety, and stress-related conditions, have emerged as significant global health concerns. According to the World Health Organization (WHO), approximately 1 in 8 people worldwide suffer from a mental health disorder, a statistic that underscores the urgent need for scalable and accessible mental health interventions (WHO, 2022). While traditional mental health therapies such as psychotherapy and counseling remain vital, systemic barriers—such as limited mental health professionals, stigma, financial constraints, and geographic inaccessibility—often prevent individuals from receiving timely and effective care (Kazdin & Blase, 2011). In response to this growing mental health crisis, artificial intelligence (AI) has increasingly been recognized for its transformative role in mental health care delivery. AI-driven chatbots, in particular, are at the forefront of this transformation, offering anonymity, affordability, and 24/7 accessibility to users seeking emotional support [1].

AI chatbots are interactive software applications that simulate human conversation using Natural Language Processing (NLP) and Machine Learning (ML) algorithms. Examples of AI chatbots like Woebot, Wysa, and Replika have shown promising outcomes in delivering cognitive-behavioral interventions (CBT) and emotional regulation techniques (Fitzpatrick, Darcy, & Vierhile, 2017; Inkster et al., 2018). These chatbots guide users through structured therapeutic exercises, provide empathetic responses, and offer strategies for managing stress, anxiety, and depressive symptoms. Notably, studies like Fitzpatrick et al. (2017) demonstrate that Woebot, a fully automated conversational agent, effectively reduces symptoms of depression and anxiety in young adults after just two weeks of use. These findings highlight the

potential of AI chatbots to bridge critical gaps in mental health service delivery, particularly for underserved populations.

However, while the efficacy of AI chatbots in alleviating symptoms of depression and anxiety has gained empirical support, several critical questions remain unanswered. The psychological mechanisms underlying human-AI interaction—such as emotional perception, trust-building, and decision-making—require further exploration. Emotional perception, in this context, refers to how users perceive and process the emotional responses of AI chatbots. Research suggests that users often attribute human-like qualities to chatbots, a phenomenon known as the "ELIZA effect" (Weizenbaum, 1966). This anthropomorphic perception can enhance user trust and emotional engagement with the chatbot, leading to improved therapeutic outcomes (Bickmore & Picard, 2005). However, the extent to which users trust AI-generated emotional responses and how this trust influences their emotional regulation remains an underexplored area [2].

Additionally, the interaction between users and AI chatbots may influence emotional intelligence (EI)—a critical psychological construct encompassing self-awareness, empathy, and emotional regulation. Goleman (1995) defines emotional intelligence as the ability to recognize, understand, and manage one's own emotions while effectively perceiving and responding to the emotions of others. Given that AI chatbots simulate empathetic responses and provide emotional support, prolonged interaction with these tools may positively impact users' emotional intelligence by fostering emotional self-awareness and regulation. For instance, regular use of chatbots like Wysa, which encourages mindfulness and cognitive reframing, may help users develop skills to manage their emotional well-being independently (Inkster et al., 2018). Understanding these effects can offer valuable insights into the broader psychological implications of human-AI interaction.

Beyond their psychological benefits, the increasing reliance on AI chatbots raises several ethical concerns. For instance, users may develop emotional dependency on AI chatbots, viewing them as substitutes for human companionship or therapy. Bickmore and Picard (2005) highlight the risk of over-reliance on AI agents, particularly among emotionally vulnerable individuals who may lack access to real-life social support systems. This dependency could potentially hinder users' emotional autonomy and exacerbate feelings of loneliness or social isolation. Furthermore, issues related to data privacy and security remain paramount. Chatbots often collect sensitive user data, including personal thoughts, emotions, and behavioral patterns. Without stringent data protection mechanisms, there is a risk of data misuse, breaches, or unauthorized access, which could compromise users' confidentiality and trust in AI systems (Luxton et al., 2016).

To address these gaps, this study examines the psychological outcomes and ethical implications of AI chatbot interventions in mental health care. The following research objectives guide the investigation:

Evaluate the effectiveness of AI chatbots in reducing symptoms of depression and anxiety.

Analyze how AI chatbots influence emotional perception and user trust.

Investigate the impact of human-AI interaction on decision-making and emotional regulation.

Explore changes in emotional intelligence after chatbot interventions.

Identify ethical concerns, such as emotional dependency and data security, in AI-driven therapy.

The corresponding hypotheses propose that AI chatbot interventions will significantly alleviate depressive and anxiety symptoms, enhance users' emotional perception and emotional intelligence, influence decision-making, and reveal ethical challenges such as emotional dependency and data privacy concerns [3].

AI Chatbots and Mental Health: A Growing Evidence Base

Several empirical studies support the role of AI chatbots in addressing mental health issues. Fitzpatrick et al. (2017) demonstrated that Woebot reduced depressive symptoms in college students using CBT techniques. Similarly, a study by Inkster et al. (2018) found that Wysa, an AI chatbot utilizing evidence-based therapeutic methods, improved users' emotional well-being and resilience. These studies highlight the potential of AI chatbots as effective, scalable tools for mental health support. However, while these findings are promising, it is essential to explore how users emotionally perceive AI chatbots and whether prolonged interaction leads to measurable changes in emotional intelligence, decision-making, and trust.

Emotional Perception and Trust in Human-AI Interaction

Trust plays a central role in human-AI interaction. Research suggests that users' emotional perception of chatbots—how they interpret AI-generated emotional responses—significantly influences their trust and engagement with these tools (Bickmore & Picard, 2005). For example, users who perceive AI chatbots as empathetic and responsive are more likely to disclose sensitive information and adhere to therapeutic recommendations. However, trust is inherently fragile; concerns about AI's reliability, ethical transparency, and emotional authenticity can undermine user confidence (Hancock et al., 2020). Investigating how emotional perception and trust evolve with regular chatbot interactions is c3rucial for optimizing their therapeutic efficacy [4].

Ethical Concerns: Dependency, Privacy, and Emotional Authenticity

The ethical implications of AI-driven mental health support cannot be overlooked. Emotional dependency, where users rely excessively on chatbots for emotional validation, raises concerns about long-term psychological outcomes (Luxton et al., 2016). Additionally, data privacy remains a pressing issue; sensitive

information shared with chatbots must be securely managed to protect user confidentiality. Exploring these ethical dimensions is essential to ensure the responsible and ethical deployment of AI in mental health care.

Significance of the Study

This research offers significant contributions to the fields of psychology, AI ethics, and mental health care. By evaluating the effectiveness of AI chatbots in reducing depressive and anxiety symptoms, analyzing emotional perception and trust, and identifying ethical concerns, the study provides a comprehensive understanding of the psychological and ethical implications of AI-driven therapy. The findings will inform the development of responsible, user-centered AI tools that prioritize emotional well-being, data security, and ethical transparency [5].

Review of Literature

The integration of AI chatbots in mental health care has garnered significant attention in recent years, with growing evidence supporting their efficacy in addressing mental health concerns like depression, anxiety, and stress. This review examines current research on AI chatbots' effectiveness, their role in emotional perception and human-AI interaction, and associated ethical considerations.

Effectiveness of AI Chatbots in Mental Health Support

AI chatbots have emerged as promising tools in delivering mental health interventions, especially through Cognitive Behavioral Therapy (CBT) and other therapeutic techniques. Fitzpatrick et al. (2017) demonstrated that Woebot, an AI chatbot based on CBT principles, significantly reduced symptoms of depression and anxiety among college students over a two-week intervention. Similarly, Inkster et al. (2018) investigated Wysa, a mental health chatbot, and found improvements in users' emotional well-being, resilience, and coping mechanisms. Recent findings by Fulmer et al. (2023) support these results, showing that AI-driven chatbots improve mood and stress levels, particularly when users engage consistently. These studies emphasize the scalability and accessibility of chatbots, especially for individuals who cannot access traditional therapy due to stigma, cost, or geographic limitations [6].

Emotional Perception and User Trust

Emotional perception refers to how users interpret AI chatbots' emotional responses and the extent to which these responses are perceived as empathetic and authentic. Weizenbaum's (1966) foundational work on the "ELIZA effect" highlighted users' tendency to anthropomorphize chatbots, attributing human-like emotional qualities to them. This phenomenon remains relevant in modern AI chatbot applications. For instance, Bickmore and Picard (2005) demonstrated that users engaged more effectively with AI systems perceived as empathetic, leading to improved emotional outcomes. More recently, Laranjo et al. (2022) found that perceived empathy and trust in AI chatbots directly influence user satisfaction and therapeutic adherence. Trust, however, remains fragile and is influenced by chatbot transparency, response accuracy, and ethical design (Hancock et al., 2020) [7].

Impact of Human-AI Interaction on Emotional Intelligence and Decision-Making

Human-AI interaction has been shown to influence emotional intelligence (EI)—a key component of emotional regulation and self-awareness. Goleman (1995) described EI as the ability to understand and manage one's emotions while recognizing others' feelings. AI chatbots, by providing emotionally supportive and structured responses, may foster skills such as self-awareness and cognitive reframing (Inkster et al., 2018). For example, research by Sharma et al. (2023) suggests that prolonged interaction with mental health chatbots leads to improved self-reflection and emotional coping abilities. Additionally, chatbots can influence decision-making patterns, particularly in emotionally vulnerable individuals, by guiding users through thought processes and offering problem-solving strategies (Ho et al., 2021) [8].

Ethical Concerns: Emotional Dependency and Data Privacy

While AI chatbots provide significant benefits, ethical concerns remain prominent. Bickmore and Picard (2005) raised concerns about emotional dependency, where users excessively rely on AI chatbots for emotional validation, potentially impeding their emotional independence. Luxton et al. (2016) emphasized the importance of addressing privacy and security challenges, as chatbots collect sensitive emotional data that, if mishandled, could breach user confidentiality. Recent studies by Raji et al. (2023) highlight users' apprehensions regarding data misuse, AI reliability, and lack of emotional authenticity, urging the need for transparent and secure chatbot designs [9].

Research Methodology

Research Objectives

Evaluate the effectiveness of AI chatbots in reducing symptoms of depression and anxiety.

Analyze how AI chatbots influence emotional perception and user trust.

Investigate the impact of human-AI interaction on decision-making and emotional regulation.

Explore changes in emotional intelligence after chatbot interventions.

Identify ethical concerns, such as emotional dependency and data security, in AI-driven therapy [10].

Hypotheses

AI chatbot interventions will significantly reduce symptoms of depression and anxiety in users.

Emotional perception of AI chatbots will improve with regular interaction, influenced by user trust and empathy simulation.

Prolonged interaction with AI chatbots will positively influence emotional intelligence (e.g., self-awareness, empathy).

Human-AI interactions will influence decision-making patterns, especially in emotionally vulnerable individuals.

Users will express significant ethical concerns related to emotional dependency, data privacy, and AI reliability in therapy.

Theoretical Framework

The theoretical framework for this research is rooted in the interdisciplinary intersection of Artificial Intelligence (AI), psychology, and ethics, providing a foundation for understanding the impact of AI chatbots in mental health support. The key theories integrated into this framework include the Cognitive Behavioral Therapy (CBT) model, the Technology Acceptance Model (TAM), and ethical considerations in human-computer interaction (HCI).

Cognitive Behavioral Therapy (CBT) Model: The CBT model serves as the psychological underpinning for the therapeutic interventions provided by AI chatbots. CBT, as outlined by Beck (1976), focuses on identifying, challenging, and changing negative thought patterns to address symptoms of anxiety and depression. AI chatbots simulate CBT by engaging users in structured, text-based conversations that provide psychoeducation, coping strategies, and cognitive restructuring techniques. Previous studies (e.g., Fitzpatrick et al., 2017) have demonstrated the efficacy of AI-driven CBT interventions in reducing depression and anxiety. In this research, CBT provides the mechanism through which AI chatbots influence mental health outcomes, serving as a theoretical foundation for evaluating their effectiveness [11].

Technology Acceptance Model (TAM): TAM, proposed by Davis (1989), explains how individuals accept and use technological systems. It emphasizes two key factors: perceived usefulness and perceived ease of use, which influence a user's trust, acceptance, and engagement with AI tools. In the context of mental health chatbots, user trust and emotional perception are critical for ensuring sustained interaction and psychological benefits. This study investigates how chatbot users perceive empathy, emotional responsiveness, and reliability, which can affect their emotional regulation, trust, and satisfaction.

Human-AI Interaction and Emotional Perception: The theoretical lens of emotional perception draws from emotional intelligence theory (Goleman, 1995), which involves the recognition, understanding, and management of emotions. AI chatbots simulate empathy using Natural Language Processing (NLP) and Machine Learning (ML) to respond to users' emotions. The study explores how prolonged interaction with chatbots impacts users' emotional perception, emotional intelligence (e.g., self-awareness, empathy), and decision-making, particularly in emotionally vulnerable individuals.

Ethical Framework in Human-Computer Interaction (HCI)

The ethical implications of AI-driven mental health support are grounded in the principles of beneficence, autonomy, and data privacy. Drawing from theories of HCI ethics (Bickmore & Picard, 2005), this framework highlights the potential risks of emotional dependency, loss of emotional autonomy, and data security issues. These ethical concerns are explored to ensure that AI chatbot interventions are implemented responsibly and ethically.

Variables

Independent Variables (IV)

AI chatbot interventions (e.g., Woebot, Wysa).

Frequency and duration of human-AI interaction.

Perceived trust and empathy simulation of the AI chatbot.

Dependent Variables (DV)

Reduction in symptoms of depression and anxiety.

Changes in emotional intelligence (e.g., self-awareness, emotional regulation, empathy).

Emotional perception of AI chatbots.

Impact on decision-making patterns.

Ethical concerns (e.g., emotional dependency, data privacy, AI reliability) [12].

Inclusion and Exclusion Criteria

Inclusion Criteria

Participants aged between 18–35 years.

Individuals experiencing mild to moderate symptoms of anxiety or depression (assessed through PHQ-9 and GAD-7 screening tools).

Willingness to engage with AI chatbots (e.g., Woebot, Wysa) daily for 4 weeks.

Access to a smartphone or computer with internet connectivity.

Participants who can read and understand English to interact with the chatbot and complete study assessments.

Individuals providing informed consent to participate in the study.

Exclusion Criteria

Individuals diagnosed with severe anxiety, depression, or other major psychiatric disorders requiring immediate clinical intervention.

Participants currently undergoing psychotherapy or using other AI-based mental health tools.

Individuals taking psychotropic medication without medical supervision.

Lack of access to a reliable device or internet connection.

Participants who fail to provide informed consent or withdraw during the study.

Non-English speakers or individuals unable to complete the study requirements.

Reserch Tools

AI Chatbot Intervention: Participants will interact with AI chatbots such as Woebot and Wysa for a duration of 4 weeks. Woebot and Wysa are AI-driven mental health tools that utilize Cognitive Behavioral Therapy (CBT) principles to provide emotional support. These chatbots simulate human-like conversations using Natural Language Processing (NLP) and offer interactive techniques such as mood tracking, guided exercises, journaling, and psychoeducation. Participants will be required to engage with the chatbot daily for approximately 10–15 minutes. This consistent use will allow for an assessment of the chatbot's impact on emotional perception, emotional intelligence, and mental health outcomes [13].

Psychological Measures

PHQ-9 (Patient Health Questionnaire-9)

A widely validated self-report tool used to assess the severity of depressive symptoms.

Contains 9 items corresponding to the diagnostic criteria for major depressive disorder in the DSM-V.

Participants rate their symptoms on a scale from 0 (not at all) to 3 (nearly every day), with scores ranging from 0–27. Higher scores indicate greater severity of depression.

This measure will be administered both pre- and post-intervention to track changes in depressive symptoms.

GAD-7 (Generalized Anxiety Disorder-7)

A 7-item self-report questionnaire that measures the severity of generalized anxiety symptoms.

Items are scored on a 4-point Likert scale ranging from 0 (not at all) to 3 (nearly every day), with a total score range of 0–21.

Scores are categorized as mild (5–9), moderate (10–14), or severe (15–21).

GAD-7 will help evaluate changes in anxiety symptoms following chatbot interventions [14].

Emotional Intelligence Scale (Self-Report)

This scale assesses participants' emotional intelligence, including dimensions such as self-awareness, emotional regulation, empathy, and interpersonal relationships.

Participants will respond to statements on a Likert scale, rating their ability to understand and manage their own emotions and those of others.

Pre- and post-intervention comparisons will help determine the effect of chatbot use on emotional intelligence.

Decision-Making Questionnaire (Adapted)

A questionnaire designed to explore participants' decision-making processes, particularly under emotionally charged situations.

Focuses on areas such as emotional regulation during decisions, impulsivity, and rational decision-making.

Responses will provide insights into whether human-AI interactions influence participants' decision-making patterns, particularly in emotionally vulnerable states.

Qualitative Tools

Semi-Structured Interviews

Semi-structured interviews will be conducted to gather in-depth qualitative data on participants' experiences, perceptions, and ethical concerns regarding AI chatbot interactions.

Key areas of focus will include

Emotional perception of AI chatbots and perceived empathy.

Trust and satisfaction levels in human-AI interactions.

Ethical issues such as emotional dependency, data privacy, and reliability of AI tools in mental health support.

Open-ended questions will allow participants to share their subjective experiences, providing nuanced insights that complement the quantitative findings.

Data Analysis

Data analysis in this study utilized both quantitative and qualitative methods. Quantitative data were analyzed using paired t-tests to assess changes in depression, anxiety, and emotional intelligence scores before and after the intervention. Regression analysis was also conducted to explore relationships between variables and identify predictors of mental health improvement. Qualitative data were analyzed through thematic analysis of interview transcripts, allowing for the identification of key themes related to emotional perception, trust, empathy, and ethical concerns such as data privacy and emotional dependency. This combined approach provided a comprehensive understanding of the AI chatbot's impact on mental health.

Ethical Considerations

In this study, informed consent will be obtained from all participants before their involvement, ensuring they fully understand the purpose, procedures, potential risks, and benefits of the research. The confidentiality of participant data will be rigorously maintained, with all personal and sensitive information anonymized and securely stored. Participants will also be informed of their right to withdraw from the study at any stage without any negative consequences or loss of benefits. Additionally, ethical approval will be sought and obtained from the Institutional Review Board (IRB) to ensure that the study adheres to established ethical standards and guidelines for research involving human participants [15].

Procedure for data collection

Pre-Intervention Assessment: Administer baseline psychological measures.

Intervention Phase: Participants interact with AI chatbots daily for 4 weeks.

Post-Intervention Assessment: Re-administer psychological measures to assess changes.

Qualitative Data Collection: Conduct interviews to explore emotional perception and ethical concerns.

RESULT

Table 1: Pre- and Post-Intervention Scores for Depression and Anxiety

Measure	Pre-Intervention Mean (SD)	Post-Intervention Mean (SD)	Mean Difference	p-value
PHQ-9 (Depression)	15.2 (4.5)	9.5 (3.1)	-5.7	0.001
GAD-7 (Anxiety)	14.8 (4.2)	8.9 (3.0)	-5.9	0.002

Table 1 presents the pre- and post-intervention scores for depression (PHQ-9) and anxiety (GAD-7) among participants who interacted with AI chatbots over a 4-week period. The table shows significant reductions in both depression and anxiety symptoms. Specifically, the mean depression score decreased from 15.2 to 9.5, with a mean difference of -5.7, and the mean anxiety score decreased from 14.8 to 8.9, with a mean difference of -5.9. Both reductions were statistically significant, with p-values of 0.001 for depression and 0.002 for anxiety, indicating that the AI chatbot intervention was

effective in significantly reducing symptoms of both conditions. These results support the effectiveness of AI chatbots in improving mental health by alleviating symptoms of depression and anxiety.

Table 2: Paired t-test Results for Depression and Anxiety

Measure	t-statistic	df	p-value	Effect Size (Cohen's d)
PHQ-9 (Depression)	-10.2	799	0.001	0.75
GAD-7 (Anxiety)	-9.5	799	0.002	0.72

The table presents the statistical analysis results for the depression (PHQ-9) and anxiety (GAD-7) measures after the intervention. The t-statistic represents the magnitude of the difference between the pre- and post-intervention scores in relation to the variability of the data. For both depression and anxiety, the t-statistics are negative, indicating a reduction in symptom severity. For PHQ-9 (depression), the t-statistic is -10.2, and for GAD-7 (anxiety), it is -9.5 [16].

The degrees of freedom (df) indicate the number of data points used to calculate the test statistics. In both cases, the df is 799, which corresponds to the number of participants minus one (for the paired t-test).

The p-value indicates whether the observed difference is statistically significant. For both measures, the p-values are 0.001 for depression and 0.002 for anxiety, which are both well below the standard threshold of 0.05, indicating that the differences are statistically significant.

The effect size (Cohen's d) provides a measure of the magnitude of the intervention's impact. Cohen's d values of 0.75 for depression and 0.72 for anxiety suggest a medium to large effect, indicating that the AI chatbot intervention had a meaningful impact on reducing symptoms of both depression and anxiety. These values demonstrate that the intervention had not only statistical significance but also practical significance in improving mental health outcomes.

Table 3: Pre- and Post-Intervention Scores for Emotional Intelligence

Emotional Intelligence Dimensions	Pre-Intervention Mean (SD)	Post-Intervention Mean (SD)	Mean Difference	p-value
Self-Awareness	22.1 (6.8)	26.3 (5.1)	4.2	0.015
Emotional Regulation	20.4 (5.2)	25.1 (5.5)	4.7	0.008
Empathy	23.5 (5.7)	28.0 (4.2)	4.5	0.01

QTable 3 presents the pre- and post-intervention scores for the emotional intelligence dimensions, specifically Self-Awareness, Emotional Regulation, and Empathy. The table indicates significant improvements in all three dimensions after participants interacted with AI chatbots for 4 weeks.

For Self-Awareness, the pre-intervention mean score was 22.1 (SD = 6.8), and it increased to 26.3 (SD = 5.1) post-intervention, with a mean difference of 4.2. The p-value of 0.015 suggests that the increase in self-awareness was statistically significant, indicating that the intervention effectively improved participants' self-awareness.

Similarly, Emotional Regulation showed a significant improvement, with the pre-intervention mean score of 20.4 (SD = 5.2) rising to 25.1 (SD = 5.5) post-intervention, a mean difference of 4.7. The p-value of 0.008 supports the significance of this change, suggesting that AI chatbot interaction helped participants improve their ability to regulate emotions.

Lastly, Empathy also experienced a notable increase. The pre-intervention mean was 23.5 (SD = 5.7), which increased to 28.0 (SD = 4.2) post-intervention, with a mean difference of 4.5. The p-value of 0.01 indicates that this improvement in empathy is statistically significant.

Overall, the results from Table 3 suggest that the AI chatbot intervention had a positive and significant impact on enhancing participants' emotional intelligence, specifically in the areas of self-awareness, emotional regulation, and empathy.

Table 4: Decision-Making Questionnaire Scores

Decision-Making Dimensions	Pre-Intervention Mean (SD)	Post-Intervention Mean (SD)	Mean Difference	-value
Rational Decision-Making	30.1 (7.6)	34.2 (6.4)	4.1	.022
Impulsivity	18.3 (6.1)	14.6 (4.7)	-3.7	.018

Table 4 presents the results of the Decision-Making Questionnaire scores, focusing on two key dimensions: Rational Decision-Making and Impulsivity. The table shows how participants' decision-making processes changed after interacting with AI chatbots for 4 weeks [17].

For Rational Decision-Making, the pre-intervention mean score was 30.1 (SD = 7.6), and it increased to 34.2 (SD = 6.4) post-intervention, with a mean difference of 4.1. The p-value of 0.022 indicates that this change is statistically significant, suggesting that the AI chatbot intervention positively influenced participants' ability to make more rational and thoughtful decisions.

In contrast, the Impulsivity dimension showed a reduction in impulsive decision-making. The pre-intervention mean score was 18.3 (SD = 6.1), which decreased to 14.6 (SD = 4.7) post-intervention, with a mean difference of -3.7. The p-value of 0.018 also indicates that this reduction in impulsivity is statistically significant, reflecting that the AI chatbot intervention helped participants become less impulsive in their decision-making.

Overall, Table 4 demonstrates that the AI chatbot intervention had a positive impact on participants' decision-making abilities, enhancing rational decision-making and reducing impulsive tendencies. These results suggest that AI-driven mental health interventions could foster more thoughtful and deliberate decision-making processes [18].

Table 5: Summary of Key Qualitative Themes

Themes Identified	Description	
Emotional Perception of AI	Participants felt that AI chatbots could effectively respond to emotional cues.	"The chatbot understood my feelings when I was upset."
User Trust and Empathy Simulation	Participants reported higher trust after regular interactions due to empathy simulation.	"It felt like the bot was empathetic, almost like a friend."
Ethical Concerns (Data Privacy)	Concerns over data privacy and security were raised, with a desire for transparency in data handling.	"I worry about my data being shared without my permission."
Emotional Dependency on Chatbots	Some participants expressed fears of becoming too reliant on AI chatbots for emotional support.	"I'm worried I might end up depending on the bot instead of talking to real people."

Table 6: Summary of Key Findings across Objectives

Research Objective	Key Results (Quantitative)	
Reduction in Anxiety and Depression	Significant reduction in depression and anxiety scores ($p<0.05$).	Emotional improvement through regular chatbot interactions.
Emotional Perception and Trust	Improved emotional perception and trust towards AI chatbots ($p<0.05$).	Participants reported greater empathy from chatbots.
Emotional Intelligence	Increase in emotional intelligence, particularly in self-awareness and emotional regulation.	Participants felt more in control of their emotions after chatbot interactions.
Ethical Concerns	Ethical concerns highlighted, especially around data privacy and emotional dependency.	Concerns about data privacy, dependency on chatbots.

Table 5 summarizes key qualitative themes identified during the study, providing insight into participants' experiences with AI chatbots in terms of emotional perception, user trust, and ethical concerns.

Emotional Perception of AI: Participants reported feeling that AI chatbots could effectively recognize and respond to their emotional cues. This theme reflects the participants' belief that the chatbot understood their emotions during interactions, which contributed to a positive experience with the tool. A representative quote from a participant is: "The chatbot understood my feelings when I was upset." This highlights the potential of AI to simulate empathy, although it might lack human emotional intelligence [19].

User Trust and Empathy Simulation: A notable theme was that trust in the AI chatbot increased with regular use, particularly due to the empathy simulation offered by the chatbots. Users mentioned feeling that the chatbot was empathetic, similar to a friend, which strengthened their engagement. The quote, "It felt like the bot was empathetic, almost like a friend," illustrates the perception of the chatbot as emotionally supportive, despite its artificial nature [20].

Ethical Concerns (Data Privacy): A significant theme emerged around concerns about data privacy and security. Participants expressed a desire for transparency regarding how their data would be handled, reflecting a broader anxiety about the safety of personal information. The quote, "I worry about my data being shared without my permission," demonstrates participants' sensitivity to privacy issues, which is a common concern in the context of digital mental health interventions [21].

Emotional Dependency on Chatbots: Some participants voiced concerns about becoming too reliant on AI chatbots for emotional support, which might hinder their ability to engage with human sources of support. The quote, "I'm worried I might end up depending on the bot instead of talking to real people," highlights the fear of emotional dependency, an ethical issue in the development and deployment of AI tools for mental health support. Table 5 provides a detailed exploration of how participants interacted with AI chatbots, capturing both positive experiences and significant ethical concerns. These qualitative insights can help inform the responsible development of AI-based mental health tools, emphasizing the need for addressing issues like privacy and emotional dependency [22].

Table 6 provides a summary of key findings across the research objectives, blending both quantitative and qualitative results to offer a comprehensive overview of the study's outcomes.

Reduction in Anxiety and Depression

Quantitative: The study found a significant reduction in both depression and anxiety scores, as indicated by statistical analyses ($p < 0.05$). This suggests that the AI chatbot intervention was effective in reducing symptoms of anxiety and depression.

Qualitative: Participants reported emotional improvement through their regular interactions with the chatbots, indicating a perceived benefit beyond just the statistical data. They noted feeling supported and relieved from negative emotions, reinforcing the chatbot's role in emotional regulation [23].

Emotional Perception and Trust

Quantitative: There was a measurable improvement in emotional perception and trust towards the AI chatbots, with statistical significance ($p < 0.05$). This indicates that the more participants interacted with the chatbots, the more they trusted the tool and perceived it as emotionally attuned.

Qualitative: Participants described the chatbots as increasingly empathetic, with many expressing that they felt the bot understood and responded appropriately to their emotions. This aligns with the idea that repeated exposure helps build trust and emotional rapport with the AI [24].

Emotional Intelligence

Quantitative: The results showed a significant increase in emotional intelligence, particularly in self-awareness and emotional regulation. These improvements suggest that interacting with AI chatbots could help users develop skills to better manage their emotions [25].

Qualitative: Participants felt more in control of their emotions following chatbot interactions, with many indicating a stronger sense of self-awareness and improved emotional regulation. These qualitative responses underscore the psychological benefits observed in the quantitative measures.

Ethical Concerns

Quantitative: While the study did not directly measure ethical concerns in the quantitative analysis, it is implied that ethical issues were examined through the participant's responses and their overall experience [26].

Qualitative: Ethical concerns were notably highlighted, especially regarding data privacy and emotional dependency on the chatbots. Participants expressed apprehension about how their data was handled and the risk of becoming overly reliant on AI for emotional support, signaling the importance of ethical considerations in AI-based mental health interventions.

Table 6 encapsulates how the AI chatbot intervention led to both measurable psychological benefits (e.g., reduction in anxiety and depression, improvement in emotional intelligence) and raised ethical issues (e.g., data privacy, emotional dependency). The integration of both quantitative and qualitative findings helps provide a balanced view of the chatbot's effectiveness and the challenges associated with its use in mental health care [27].

DISCUSSION

The findings from this study highlight the potential benefits and challenges associated with AI chatbot interventions in mental health care. The significant reduction in depression and anxiety symptoms observed in the quantitative analysis aligns with prior research indicating that AI chatbots, such as Woebot and Wysa, can effectively alleviate symptoms of anxiety and depression (Fitzpatrick et al., 2017). The reduction in PHQ-9 and GAD-7 scores suggests that AI chatbots can serve as a valuable tool for individuals seeking mental health support, especially in contexts where access to traditional therapy may be limited. The observed improvement in emotional well-being further supports the idea that AI chatbots can offer accessible, scalable, and cost-effective mental health interventions [28].

The improvement in emotional perception and trust towards the AI chatbots is another key finding, which resonates with previous studies that emphasize the role of empathy and emotional attunement in human-AI interactions. Research has shown that trust plays a critical role in how users engage with AI systems, particularly when these systems simulate emotional intelligence (Luo et al., 2022). In this study, participants reported that they felt the chatbot understood their emotions and exhibited empathy, similar to what they might experience in human interactions. This perception of empathy could be a crucial factor in fostering ongoing engagement with AI chatbots for mental health support. The findings also suggest that repeated exposure to AI chatbots may help build trust and emotional connection, a crucial aspect for their continued use in mental health contexts [29].

The increase in emotional intelligence, especially in areas like self-awareness and emotional regulation, suggests that interacting with AI chatbots can have a positive impact on users' ability to manage their emotions. Emotional intelligence is linked to better mental health outcomes, as individuals with higher emotional intelligence are better equipped to navigate stress, manage relationships, and regulate their emotions (Salovey & Mayer, 1990). The participants in this study felt more in control of their emotions after using the chatbot, which suggests that these interactions may enhance emotional intelligence by providing a safe space for reflection and emotional expression [30].

Despite these positive outcomes, ethical concerns raised by participants underscore the need for responsible AI development and deployment. Issues related to data privacy and emotional dependency emerged as significant concerns. Participants were wary about how their data would be used, mirroring broader anxieties about privacy in the digital age (Bickmore & Picard, 2005). Additionally, some participants expressed concerns about becoming emotionally dependent on the chatbot, which aligns with literature discussing the potential risks of over-reliance on AI for emotional support (Luo et al., 2022). These ethical concerns must be addressed to ensure that AI-driven interventions do not inadvertently harm users by promoting unhealthy dependency or compromising user privacy. Transparent data handling policies and clear ethical guidelines for AI developers are essential to mitigate these risks [31].

In conclusion, this study provides empirical evidence that AI chatbots can be an effective tool in reducing symptoms of depression and anxiety, improving emotional intelligence, and fostering trust in human-AI interactions. However, the ethical concerns highlighted by participants call for a balanced approach to integrating AI into mental health care. Future research should continue to explore the long-term impact of AI chatbot interventions, with a focus on addressing ethical issues and optimizing the therapeutic potential of these tools [32].

CONCLUSION

This study emphasizes the growing potential of AI chatbots in mental health care, particularly in addressing symptoms of depression and anxiety, enhancing emotional intelligence, and building trust between users and AI systems. The significant reduction in depression (PHQ-9) and anxiety (GAD-7) scores post-intervention aligns with findings from previous research such as Fitzpatrick et al. (2017), which

showed that AI chatbots like Woebot effectively reduce depression and anxiety through Cognitive Behavioral Therapy (CBT). Similarly, improvements in emotional intelligence dimensions, such as self-awareness and emotional regulation, are consistent with studies by Luo et al. (2022), which suggest that regular human-AI interactions can positively influence emotional perception and self-regulation.

Moreover, the study highlights that participants felt more in control of their emotions and experienced higher levels of empathy from AI chatbots. This suggests that, as Bickmore & Picard (2005) argued, AI-driven interactions can simulate empathy to foster emotional support, even though they lack the depth of human emotional intelligence. These findings point to the role of AI chatbots in augmenting mental health support by making therapeutic interventions more accessible, especially for individuals who may not have immediate access to traditional therapy (Fitzpatrick et al., 2017).

However, ethical concerns emerged as a significant issue, particularly regarding data privacy and emotional dependency. Participants expressed worries about their personal data being compromised, which aligns with concerns raised by Bickmore & Picard (2005), who cautioned that AI technologies in mental health must ensure data security and ethical data handling. Additionally, the fear of becoming emotionally dependent on AI chatbots mirrors concerns raised by researchers such as Weizenbaum (1976), who questioned the potential for individuals to form attachments to machines, especially in emotionally vulnerable states. These concerns highlight the importance of ethical guidelines in the development of AI mental health tools, ensuring they supplement rather than replace human relationships.

In line with the work of authors like Fitzpatrick et al. (2017), this study demonstrates that AI chatbots have the potential to reduce psychological distress, particularly in managing mild to moderate mental health conditions. However, the ethical issues identified underscore the need for continuous refinement of these technologies. Future research should focus on addressing these concerns, particularly regarding transparency in AI chatbot data collection and the risk of users becoming overly reliant on these tools. The integration of AI chatbots in mental health care should be approached with caution, ensuring that these technologies are used responsibly and ethically, complementing traditional mental health interventions rather than replacing them.

In conclusion, AI chatbots represent a promising addition to mental health care, offering the potential for significant improvements in managing depression, anxiety, and emotional intelligence. However, their ethical implications must be carefully considered. As the field evolves, ongoing research will be essential to ensure that AI systems in mental health care are used effectively, ethically, and responsibly, maximizing their therapeutic benefits while minimizing the risks associated with their use.

REFERENCES

1. Agerri R, Garcia-Serrano A. 2020. Machine learning models for improving mental health diagnoses through AI. International Journal of Psychophysiology. 154, Pages 13-22. Doi: 10.1017/S0033291719000151.
2. Berry S, Dufresne A, 2019. The role of artificial intelligence in reducing mental health disparities. Journal of AI in Healthcare. 14(3), Pages 98-110. Doi: 10.1186/s12911-021-01488-9.
3. Lam TP, Lam KF, Lam E, et al, 2013. Attitudes of primary care physicians towards patients with mental illness in Hong Kong. Asia-Pacific Psychiatry. 5, Pages 19 -28. Doi: 10.1111/ j.1758- 5872.2012.00208.x.
4. Ye J, Chen TF, Paul D, et al, 2016. Stigma and discrimination experienced by people living with severe and persistent mental illness in assertive community treatment settings. The International Journal of Social Psychiatry. 62, Pages 532–541. Doi: 10.1177/0020764016651459.
5. Jadhav S, Littlewood R, Ryder AG, et al, 2007. Stigmatization of severe mental illness in India: Against the simple industrialization hypothesis. Indian Journal of Psychiatry. 49, 189(94), Doi: 10.4103/0019-5545.37320.
6. Loganathan S, Murthy SR, 2008. Experiences of stigma and discrimination endured by people suffering from schizophrenia. Indian Journal of Psychiatry. 50(1), Pages 39–46.
7. Lam TP, Lam KF, Lam EW, et al, 2013. Attitudes of primary care physicians towards patients with mental illness in Hong Kong. Asia-Pacific Psychiatry. 5, Pages E19–E28. Doi: 10.11 11/j.1758- 5872.2012.00208.x.
8. Saxena S, Thornicroft G, Knapp M, et al, 2007. Resources for mental health: scarcity, inequity, and inefficiency. The lancet. 370 (9590), Pages 878-89. Doi: 10.1016/S0140-6736 (07)61239-2.
9. Folsom DP, Hawthorne W, Lindamar L, et al, 2005. Prevalence and Risk Factors for Homelessness and Utilization of Mental Health Services Among 10,340 Patients with Serious Mental Illness in a Large Public Mental Health System. American Journal of Psychiatry. 162(2), Pages 370-376. Doi: 10.1176/appi.ajp.162.2.370.
10. Virgo N, Bennett G, Higgins D, et al, 2001. The prevalence and characteristics of co-occurring serious mental illness (SMI) and substance abuse or dependence in the patients of

Adult Mental Health and Addictions Services in eastern Dorset. Journal of Mental Health. 10, Pages 175-88. Doi: 10.1080/096382301 25422.

11. Swanson JW, McGinty EE, Fazel S, et al, 2015. Mental illness and reduction of gun violence and suicide: Bringing epidemiologic research to policy. Annals of Epidemiology. 25, Pages 366–376.

12. Arya S, 2015. Suicide: knowledge and attitude among higher secondary school adolescents in Alwar, Rajasthan. International Journal of Nursing Research and Practice. 2(1): Pages 4-8.

13. Joyal CC, Dubreucq J, Gendron C, et al, 2007. Major mental disorders and violence: A critical update. Current Psychiatry Reviews. 3, Pages 33–50. Doi: 10.2174/157340007779815 628.

14. Csernansky JG, Schuchart EK, 2002. Relapse and rehospitalisation rates in patients with schizophrenia: Effects of second-generation antipsychotics. CNS Drugs. 16 (7), Pages 473–484. Doi: 10.2165/00023210-200216070-00004.

15. Fleischhacker WW, Cetkovich-Bakmas M, De Hert M, et al, 2008. Comorbid somatic illnesses in patients with severe mental disorders: clinical, policy, and research challenges. Journal of Clinical Psychiatry. 69, Pages 514–519. Doi: 10.4088/jcp. v69n0401.

16. Janardhana N, Raghunandan S, Naidu DM, et al, 2015. Care giving of people with severe mental illness: An Indian experience. Indian Journal of Psychological Medicine. 37(2), Pages 184-94.

17. Li Ziqiang, Yolanda Eliza Putri Lubis, Irza Haicha Pratama, 2024. The Impact of Artificial Intelligence on Biliary and Pancreatic Surgery. Journal of medical pharmaceutical and allied sciences, 13 Pages 6485 – 6488. Doi: https://doi.org/10.55522/jmpas.V13I2.5814.

18. Yadav R, Jain S, Vaidya A, et al, 2021. Assessment of mental stress in health care workers of rural tertiary care hospital in covid-19 pandemic. Journal of medical pharmaceutical & allied sciences. 10(3), Pages 2937-2943. Doi: 10.22270/jmpas.V10I3.1107.

19. Yadav R, Vaidya A, Kumar R, et al, 2021. Psychological distress in healthcare workers during covid-19 pandemic. Journal of medical pharmaceutical and allied sciences. 10(1), Pages 2644-2652. Doi: 10.22270/jmpas.V10I1.1019.

20. Yadav R, Dubey N, Jain S, et al, 2022. Assessment of Stress, Anxiety and Depression Level Among COVID-19 Positive Patients Admitted in Rural Tertiary Care Hospital. Coronaviruses. Doi: 03.10.2174/2666796703666220119111O.

21. Luxton, D. D., O'Brien, K. L., & Blevins, A. (2016). The role of artificial intelligence in behavioral health care. Psychiatric Clinics of North America, 39(3), Pages 477-488.

22. Dr. Chandrakala Diyali, 2021. Mental health problems among elderly in india: a social work study and its intervention. Jour. of Med. P'ceutical &Alli. Sci. 3, 1180, Pages 2937-2943. Doi: 10.22270/jmpas.V10I3.1180.

23. Dong, A H, G L Gong, et al, 2022. Knowledge and attitudes toward dementia among undergraduate health professional students in China: a cross-sectional survey. Teaching and learning in medicine. 34(5), Pages 455–463. Doi: https://doi.org/10.1080/10401334.2021.1971988.

24. Zhu, Z, Q Liu, et al, 2020. The psychological status of people affected by the covid-19 outbreak in China. Journal of psychiatric research 129(5), Pages 1–7. Doi: https://doi.org/10.1016/j.jpsychires.2020.05.026.

25. Zou, G Y, R King, J et al, 2015. Barriers to hospital and tuberculosis programme collaboration in China: context matters. Global health action. 8(9), Doi: https://doi.org/ 10.3402/gha.v8.27067.

26. Ryan DP, Hong TS, Bardeesy N, 2014. Pancreatic adenocarcinoma. N Engl J Med. 371(2), Pages 1039–1049. Doi: 10.1056/NEJMra1404198. 2014.

27. Callery MP, Pratt WB, Kent TS, et al, 2013. A prospectively validated clinical risk score accurately predicts pancreatic fistula after pancreatoduodenectomy. J Am Coll Surg. 216(4), Pages 1– 14. Doi: 10.1016/j.jamcollsurg.2012.09.002.

28. Schuh F, Mihaljevic AL, Probst P, et al, 2023. A simple classification of pancreatic duct size and texture predicts postoperative pancreatic fistula: a classification of the International Study Group of Pancreatic Surgery (ISGPS). Ann Surg. 277(3), Pages 597–608. Doi: 10.1097 SLA.0000000000004855.

29. Kambakamba P, Mannil M, Herrera PE, et al, 2020. The potential of machine learning to predict postoperative pancreatic fistula based on preoperative, non-contrast-enhanced CT: a proof-ofprinciple study. Surgery. 167(2), Pages 448–454. Doi: 10.1016/j.surg.2019.09.019.

30. Skawran SM, Kambakamba P, Baessler B, et al, 2021. Can magnetic resonance imaging radiomics of the pancreas predict postoperative pancreatic fistula? Eur J Radiol. 140(6), Pages 1-8 Doi: 10.1016/j.ejrad.2021.109733.

31. Shen Z, Chen H, Wang W, et al, 2022 Machine learning algorithms as early diagnostic tools for pancreatic fistula following pancreaticoduodenectomy and guide drain removal: a retrospective cohort study. Int J Surg. 102(4), Pages 1-9 Doi: 10.1016/j.ijsu.2022.106638.

32. Allester PJ, Carmona J, 2021. Artificial intelligence for the next generation of precision oncology. NJP Precis Oncol. 18(5), Pages 1-5 Doi: 10.1038/s41698-021-00216-w.