

Original Research

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Evaluating the Effectiveness of AI-Driven Chatbots in Early Detection of Mental Health Disorders and Psychological Counseling

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ABSTRACT: The rapid growth of Artificial Intelligence (AI) and the development of natural-language-processing and conversational-technology systems, such as chatbots, has opened up new avenues for providing mental health support in an easily accessible manner. Chatbots driven by AI allow users to communicate in a natural way with the technology, receive psychoeducational information from it, and enable the chatbot to detect potential signs of psychological distress. The technology is able to generate basic supportive responses to users, and assist them in seeking professional help. This research investigates the potential effectiveness of AI-powered chatbots in assisting in the early identification of mental health issues and in providing initial counseling. The research will evaluate how well these four variables influence a user's perception of the effectiveness of the provided counseling: Early Detection of Symptoms; Emotional Responsiveness; Customization/Personalization; Accessibility. Descriptive and analytical data collection methods were employed via a cross-sectional study design. An additional focus point included within this research project was a survey of 229 participants who were either experienced with conversational-AI based systems or had some familiarity with them. The structured questionnaire used a five-point Likert scale to collect the participant's perceptions of their experiences with AI-assisted counseling. Frequency analysis, descriptive statistics, Cronbach's alpha reliability assessment, Pearson correlation, multiple regression analysis, independent samples t-tests, and One-Way ANOVA statistical analyses were performed to analyze the participant's ratings. As indicated by the results, there appears to be a relationship between each dimension and perceived counseling effectiveness. Specifically, customization/personalization and emotional responsiveness

appear to have a stronger relationship to perceived counseling effectiveness than does early symptom detection. Multiple regression analysis demonstrated that when considered collectively, the dimensions identified above are significant predictors of perceived counseling effectiveness. The researcher found that AI-driven chatbots may be effective supplemental tools for raising awareness about mental health issues, performing preliminary screenings, educating consumers regarding mental health, and providing counseling support. However, chatbots cannot replace the role of licensed professionals including psychologists, psychiatrists etc. Therefore, researchers conclude that any use of AI-based mental health systems requires human oversight, safeguards against misuse of personal identifiable information, valid clinical applications, clear communication of risks/benefits, and reasonable mechanisms for escalating critical care situations.

INTRODUCTION

The role of technology in delivering mental health support has been explored in a number of studies. There is evidence that mental health issues including stress, depression, anxiety, and loneliness, can impact on a range of aspects of people's lives including their educational attainment, work performance, relationships and general wellbeing. Despite there being an increasing amount of psychological and psychiatric services available across the UK in various settings, it is common for people to delay accessing these services due to a variety of factors including cost, distance from service providers, limited availability of trained staff at the time of need, long waiting lists, perceived social stigma associated with seeking help for a mental health issue, and a lack of knowledge about what types of services are available (Sharma, et.al., 2023). Therefore, the opportunity for using digital technology to support individuals who may be experiencing psychological distress has received significant interest in recent years.

One particular form of digital technology that has gained significant amounts of interest in recent years includes artificial intelligence (AI) based chatbots that utilise natural language processing (NLP) and machine learning to enable conversations between humans and computers. These systems have the ability to detect emotionally charged language, structure conversation around specific topics of discussion such as psychoeducation, ask users if they would like to engage in a certain activity designed to assist them cope with the emotions experienced during the current episode of psychological distress, track symptom severity over time, and refer users back to qualified healthcare professionals when appropriate (Badrivishal, et.al., 2026). A primary advantage of chatbots lies within their ability to deliver continuous and potentially unlimited interaction with clients.

This led researchers Jabir et al., (2024) to conduct a systematic review and meta analysis of all randomised controlled trials utilising chatbots to support the mental health needs of individuals, which included forty-one RCTs. Jabir et al. (2024) identified that while chatbots demonstrate potential as an automated method of providing personalised mental health support to large numbers of people; one key challenge that continues to hinder the successful delivery of chatbots includes client attrition. In fact, the average rate of attrition among participants receiving interventions delivered via chatbots across all thirty-nine studies included in the meta-analysis conducted by Jabir et al. (2024), was twenty-one point eight-four percent. Consequently, the authors recommend that future research should explore how best to design chatbot-based interventions that incorporate elements of human support.

BACKGROUND OF AI-DRIVEN CHATBOTS IN MENTAL HEALTH

More and more researchers have been investigating using AI-based chatbots as an additional tool to help people struggling with their mental health. AI-based chatbots allow users to talk in their own words to receive support, and can ask questions related to the user's potential mental health issues such as mood, anxiety, stress, lack of sleep, difficulty with emotions, and/or changes in behavior (Tyagi, et.al., 2016). However, it is essential to note that simply asking about symptoms does NOT qualify as a formal clinical diagnosis. The chatbot uses Natural Language Processing (NLP) and Sentiment Analysis to respond to users based on what was said by them. These two tools enable the chatbot to be able to respond in a way that is emotionally sensitive and non-judgmental. Additionally, the ability for the chatbot to personalize responses makes it so that responses from the chatbot can be tailored to the specific needs/concerns of each individual user. Because chatbots are accessible at virtually anytime and anywhere via mobile devices/computers, there is an increased opportunity for individuals to seek out basic forms

of support/information when needed most; therefore, providing one form of reduction in barriers to traditional mental health services (Vats, N., et.al., 2017). Chatbots may also provide users access to psychoeducation, self-reflective practices, coping strategies, relaxation techniques/meditation/prompted physical activity behaviors, tracking of symptoms, reminders regarding sessions/appointments/referral information, etc., but, again, if a person's situation becomes too complicated or risky, that individual will need to see a qualified mental health professional for proper evaluation and treatment.

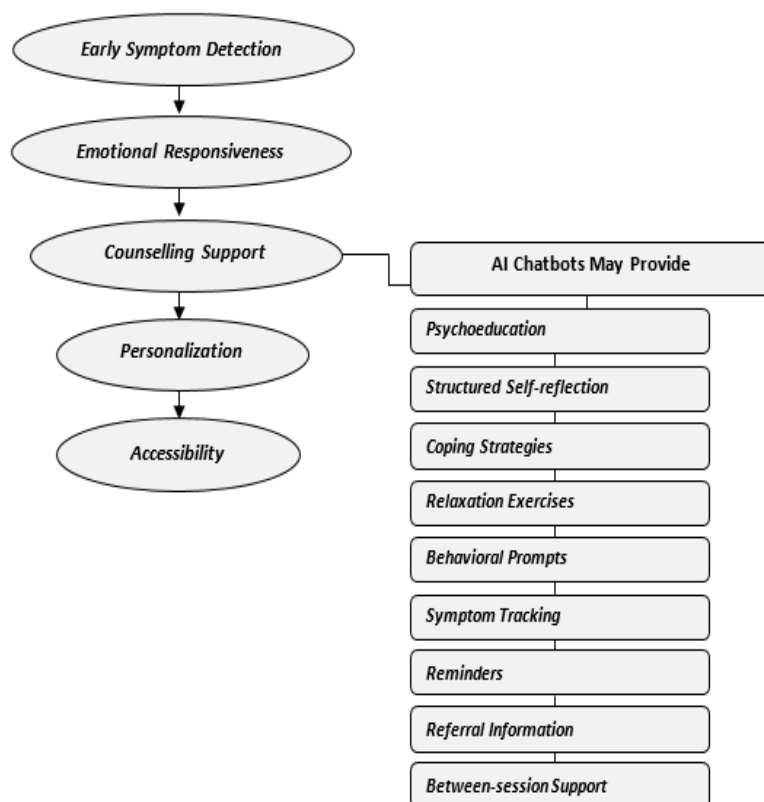


Figure 1: Applications of AI-Driven Chatbots in Mental Health

Ethical Considerations AI-Driven Mental-Health Chatbots

- Users can reveal very personal mental health details. This is why it is necessary for AI to have both secure and protect users' information (i.e., privacy) to ensure their safe use.
- The user needs to know that he/she is using an AI program versus having a real therapist/counselor.
- High risk/complex clinical issues will have to be transferred to competent, licensed therapists.
- Generative AI programs work in different ways depending on language, culture, demographics, etc. and also based on how people communicate.
- Generative AI can sometimes produce incorrect/inappropriate answers. Therefore, mental health apps must go through rigorous testing/validation.
- In the event of someone experiencing high levels of emotional distress or possibly self-harming; the app should allow the user to escalate the situation immediately.
- WHO's guidelines around AI & Health emphasize safety, fair governance, equity, confidentiality, as well as responsible implementation.

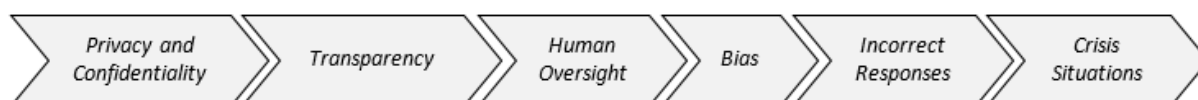


Figure 2: Ethical Consideration

ADVANTAGES OF AI-DRIVEN MENTAL-HEALTH CHATBOTS

AI-powered mental health chatbots have many benefits in terms of making tech-enabled mental health support more accessible. The first of the most significant is the 24/7 accessibility of the chatbots as the users can get support from chatbots at anytime. Users don't need to worry about getting support based upon when the counselors or mental health facilities are open. Because there are no limits as far as when users can interact with them they can be especially helpful to people that experience distressing emotions outside of traditional service hours. A second one of the biggest benefits of using AI-powered chatbots for mental health is how fast they are able to react. Once a user submits a question or concern and a chatbot receives it, it will immediately give the user a response along with additional ideas, coping strategies, or even supportive conversations without having to schedule an appointment. A third one of the benefits of using AI-powered chatbots is their ability to make accessing mental health support easy.

Users are able to communicate with the AI-powered chatbots through a smartphone, computer, tablet, etc. so long as they have internet connectivity and they can use the chatbots from anywhere in the world. The fourth one of the benefits of using AI-powered chatbots for mental health is their scalable design. Scalable means that just like how Facebook has millions of users interacting with its social media platform, AI-powered chatbots can have millions of users interacting with a single digital system. As such, this allows for the mental health support to reach a larger population than would ever be possible if a counselor was required for each person seeking help. In addition to that, AI-powered chatbots are able to adapt and personalize their interactions with users. When users submit input or begin interacting with the AI-powered chatbots, the AI-powered chatbots analyze the input and begin developing a profile of the user's needs. From there, the AI-powered chatbots then use what they learned from the user's profile to develop answers and recommendations tailored specifically to each user's needs. Furthermore, AI-powered chatbots may reduce the amount of fear users have in asking for help. Some people prefer to discuss emotionally charged topics with machines rather than humans; therefore, they may feel more confident asking a machine for help before going to see a professional. The fifth one of the benefits of using AI-powered chatbots for mental health is continued monitoring of symptoms. Because users are repeatedly engaging with the AI-powered chatbots, users will be able to track their moods, levels of stress, levels of anxiety, etc. over time.

In addition to continuing to monitor symptoms and providing users with ways to improve their mental health by providing educational materials (psychoeducation) regarding various types of mental health disorders and ways to cope with them, maintain good mental health habits (e.g., relaxation), etc. The sixth one of the benefits of using AI-powered chatbots for mental health is continuing to provide support to users after sessions have ended. Users that are seeing a therapist during the week can continue to receive reminders of things they talked about in session, obtain generalized tools for managing their symptoms between sessions, etc. And finally, another way AI-powered chatbots could be beneficial is to assist users in finding help. By analyzing user data and determining whether a situation requires human assistance (and when necessary) directing the users towards licensed therapists, counseling agencies, crisis hotlines, etc.

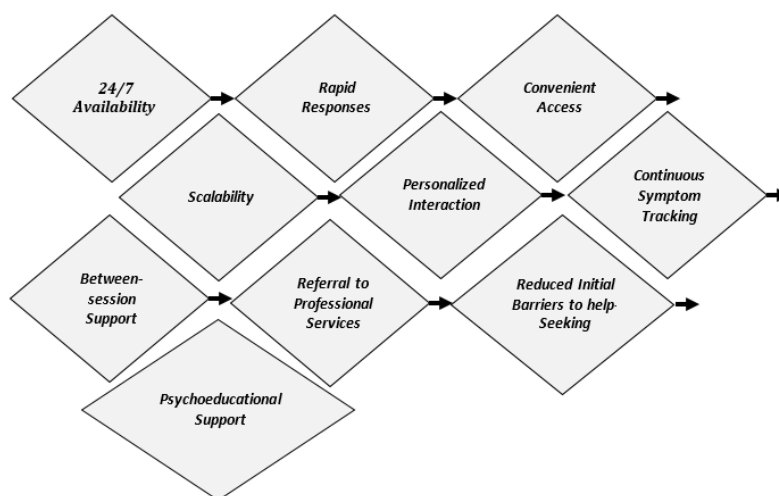


Figure 3: Advantages of AI-Driven Mental-Health Chatbots

REVIEW OF LITERATURE

1. Author(s) & Year: Abd-Alrazaq et al. (2020)		
1.	Focus /Objectives & Methodology Adopted	Major Findings/ Relevance / Research Gap
	To examine the effectiveness and safety of chatbots in improving mental health. Systematic review and meta-analysis of studies evaluating mental-health chatbots.	Chatbots demonstrated potential for reducing symptoms of depression, distress, and other mental-health problems. However, evidence regarding safety and long-term effectiveness remained limited. Provides foundational evidence for chatbot-based mental-health interventions. Further research is required on long-term engagement, safety, personalization, and real-world implementation.
2. Author(s) & Year: Bérubé et al. (2021)		
2.	Focus /Objectives & Methodology Adopted	Major Findings/ Relevance / Research Gap
	To investigate the use of voice-based conversational agents for prevention and management of chronic and mental-health conditions. Systematic literature review covering voice-based conversational-agent applications.	Voice-based agents showed potential for health education, monitoring, behavioral support, and mental-health management. User interaction and technological accessibility were important considerations. Highlights the importance of voice interaction in digital mental-health services. More evidence is needed concerning empathy, therapeutic alliance, privacy, and sustained user engagement.
3. Author(s) & Year: Cho et al. (2023)		
3.	Focus /Objectives & Methodology Adopted	Major Findings/ Relevance / Research Gap
	To integrate computer-science and medical perspectives on conversational agents designed for mental health. Integrative survey of research across computer science, NLP, healthcare, and mental-health domains.	Mental-health conversational agents increasingly incorporate NLP, machine learning, emotion recognition, and dialogue management. The study identifies differences between technological capabilities and clinical requirements. Demonstrates the need for interdisciplinary development. Greater attention is required to clinical validation, ethical safeguards, explainability, and culturally appropriate conversational design.
4. Author(s) & Year: He et al. (2023)		
4.	Focus /Objectives & Methodology Adopted	Major Findings/ Relevance / Research Gap
	To assess the effectiveness of conversational-agent interventions for mental-health problems. Systematic review and meta-analysis of randomized controlled trials.	Conversational-agent interventions showed beneficial effects for several mental-health outcomes, although intervention characteristics and study quality varied considerably. Provides stronger empirical evidence for conversational-agent interventions. Further RCTs with larger samples and longer follow-up periods are needed.
5. Author(s) & Year: Li et al. (2023)		
5.	Focus /Objectives & Methodology Adopted	Major Findings/ Relevance / Research Gap
	To evaluate AI-based conversational agents for promoting mental health and well-being. Systematic review and meta-analysis of empirical studies involving AI conversational agents.	AI conversational agents showed potential for improving mental health and psychological well-being. Engagement, communication quality, personalization, and the human-AI relationship were important factors influencing outcomes. Highly relevant to AI-enabled mental-health support. The study indicates a need to investigate personalization, therapeutic relationships, user trust, and long-term effectiveness.
6. Author(s) & Year: Jabir et al. (2024)		
6.	Focus /Objectives & Methodology Adopted	Major Findings/ Relevance / Research Gap
	To examine attrition and dropout in conversational-agent-delivered mental-health interventions. Systematic review and meta-analysis.	Attrition represents a significant challenge in conversational-agent interventions. Engagement can decline over time, indicating that effectiveness depends not only on intervention quality but also on sustained participation. Directly highlights the engagement problem. Future research should examine personalization, conversational quality, reminders, empathy, usability, and adaptive interventions to reduce dropout.
7. Author(s) & Year: Sanjeeva et al. (2024)		
7.	Focus /Objectives & Methodology Adopted	Major Findings/ Relevance / Research Gap
	To review empathic conversational-agent platform designs and their evaluation in mental-health contexts. Systematic review of empathic conversational-agent designs and evaluation approaches.	Empathy is increasingly incorporated into conversational agents through dialogue strategies, emotion recognition, personalization, and supportive responses. However, evaluation approaches remain heterogeneous. Particularly important for studying empathy and user experience. There is a need for standardized evaluation frameworks and evidence regarding whether simulated empathy produces clinically meaningful benefits.
8. Author(s) & Year: World Health Organization (2024a)		
8.	Focus /Objectives & Methodology Adopted	Major Findings/ Relevance / Research Gap
	To examine opportunities, risks, and governance requirements associated with AI in health. Global policy and governance guidance based on evidence and international health considerations.	AI can support diagnosis, treatment, health-system management, surveillance, and access to healthcare, but governance, equity, privacy, regulation, and human rights must be addressed. Establishes the broader policy context for AI-enabled mental-health systems. Research should examine responsible AI implementation, privacy, transparency, accountability, and equity.
9. Author(s) & Year: World Health Organization (2024b)		
9.	Focus /Objectives & Methodology Adopted	Major Findings/ Relevance / Research Gap
	To support countries in deploying responsible AI technologies for equitable health outcomes. Policy and strategic guidance for responsible AI adoption in health systems.	WHO emphasizes safe, ethical, equitable, and sustainable AI adoption and highlights governance, regulation, capacity building, and public trust. Relevant to implementation of AI mental-health services, particularly in developing countries. Further empirical research is needed on organizational readiness, infrastructure, workforce acceptance, and accessibility.
10. Author(s) & Year: World Health Organization (2025)		
10.	Focus /Objectives & Methodology Adopted	Major Findings/ Relevance / Research Gap
	To provide ethical and governance guidance for large multimodal AI models used in health. International guidance addressing ethical, regulatory, technical, and governance considerations for large multimodal models.	The guidance emphasizes safety, accountability, transparency, human oversight, data protection, stakeholder participation, and evaluation of AI systems. It recognizes the expanding use of multimodal generative AI in healthcare. Highly relevant to emerging generative-AI and multimodal conversational agents. Future studies should examine how these governance principles can be operationalized specifically in mental-health chatbots and AI counselors.

STATEMENT OF THE PROBLEM

Although there has been an increase in the use of AI based mental health technologies, a number of questions still exist about how effective they are. While AI Chatbots can be seen as being both easily accessible and easy to interact with, simply providing these two aspects do not necessarily equate to a psychological benefit. Whether users find the technology helpful is largely dependent upon how well it identifies symptoms at an early stage, responds emotionally, is personalized, and is available. Mental Health Applications have much higher standards for safety and ethics than most other types of Chatbot Applications. Users often will share very private, personal information (and/or) discuss serious mental health issues when using such applications. Therefore this study investigated which characteristics of selected AI driven chatbots contribute to user perception of usefulness of that technology for psychologically counseling them.

RESEARCH GAP

There exists much research supporting that Conversational Agents are effective for Mental Health Interventions; however there exist several gaps. One of those gaps is that most research has evaluated single Chatbot interventions as opposed to assessing various effectiveness dimensions using one comprehensive empirical model. Secondly, technical capability does not always equate to psychological utility. For example, a Chatbot could produce linguistically acceptable responses based upon a lack of comprehension of emotional content. Thirdly, engaging users continues to be a problem. Jabir et al. (2024) identified high rates of drop out from conversational agent mental health intervention and suggested that blended approaches should be used which include human support. Fourth, empirical evaluations of Personalization and Emotional Responsiveness continue to be needed due to the fact that communications related to mental health are extremely personalized and context dependant. Fifthly, Ethical and Governance issues continue to be important. WHO states that when AI is used in health care it must have adequate protections for Safety, Privacy, Equity, Accountability and Governance. This current study fills this gap through development of a theoretical model that links four Chatbot Characteristics to Perceived Psychological Counseling Effectiveness.

Objectives of the Study

1. To examine the effectiveness of AI-driven_chatbots in the early symptom detection (ESD) of potential mental_health concerns.
2. To examine the impact of emotional responsiveness (ER) of AI-driven chatbots on psychological counseling effectiveness (PCE).
3. To determine the impact of chatbot personalization (P) on psychological counseling effectiveness (PCE).
4. To evaluate the impact of chatbot accessibility (A) on overall psychological counseling effectiveness (PCE).

Research Questions

1. Are AI-driven_chatbots effective in identifying potential early signs of mental_health concerns?
2. Does emotional responsiveness (ER) significantly impact perceived psychological counseling effectiveness (PCE)?
3. Does personalization (P) significantly impact perceived psychological counseling effectiveness (PCE)?
4. Does accessibility (A) significantly impact perceived psychological counseling effectiveness (PCE)?

Hypotheses of the Study

- H_{01} - AI-driven_chatbot early detection capability has no significant relationship with psychological counseling effectiveness.
- H_{11} - AI-driven_chatbot early detection capability has a significant positive relationship with psychological counseling effectiveness.
- H_{02} - Emotional responsiveness (ER) of AI-driven_chatbots has no significant relationship with psychological counseling effectiveness (PCE).
- H_{12} - Emotional responsiveness (ER) of AI-driven_chatbots has a significant positive relationship with psychological counseling effectiveness (PCE).

- H₀₃- Personalization (P) of AI-driven_chatbots has no significant relationship with psychological counseling effectiveness (PCE).
- H₁₃- Personalization of AI-driven_chatbots has a significant positive relationship with psychological counseling effectiveness (PCE).
- H₀₄- Accessibility of AI-driven_chatbots has no significant relationship with psychological counseling effectiveness (PCE).
- H₁₄- Accessibility of AI-driven_chatbots has a significant positive relationship with psychological counseling effectiveness (PCE).

RESEARCH METHODOLOGY

The researcher utilized a descriptive-analytical cross-sectional design in order to investigate perceptions and inter-relationships related to AI-driven mental health chatbots. The target population consists of people who are aware of the potential uses of AI-enabled conversational technologies as well as conversational technologies that provide mental health support. Respondents (n=229) were randomly selected via purposive and convenience sampling methods based upon their familiarity with AI-enabled conversational technology. The primary method of collecting data consisted of a structured questionnaire which was developed exclusively for this study. The Likert Scale used within the questionnaire ranges from "Strongly Disagree" (1), to "Strongly Agree" (5). Four independent variables are examined by the study as indicated in the Bin Below Table. Descriptive Statistics, Cronbach's Alpha, Correlation Coefficients, Multiple Regression, T-tests and ANOVA were analyzed via the statistical program SPSS 26.

Variables Used in the Study

Variables	Types
Early Symptom Detection (ESD)	Independent Variable (IV)
Emotional Responsiveness (ER)	Independent Variable (IV)
Personalization (P)	Independent Variable (IV)
Accessibility (A)	Independent Variable (IV)
Psychological Counseling Effectiveness (PCE)	Dependent Variable (DV)

Data Analysis & Interpretation

Table 1: Gender Distribution (Demographic Profile of Respondents)

Gender_Wise	Frequency Sample Size = 229	Percentage (%)
Male	121	52.80
Female	104	45.40
Other/Prefer not to say	4	1.70
Total	229	100.00

Table 2: Age Distribution (Demographic Profile of Respondents)

Age_Wise	Frequency Sample Size = 229	Percentage (%)
18 to 25	72	31.40
26 to 35	68	29.70

36 to 45	51	22.31
46 to 55	25	10.90
>55	13	5.70
Total	229	100.00

Table 3: Frequency of AI_Chatbot Use

Usage Frequency	Frequency Sample Size = 229	Percentage (%)
Frequently	87	38.00
Occasionally	96	41.90
Rarely	46	20.10
Total	229	100.00

Table 4: Descriptive Statistics (Research Variables)

Variable	N	Mean	Std. Deviation
Early Symptom Detection (ESD)	229	4.02	0.68
Emotional Responsiveness (ER)	229	3.87	0.74
Personalization (P)	229	3.91	0.71
Accessibility (A)	229	4.18	0.63
Psychological Counseling Effectiveness (PCE)	229	3.94	0.72
The highest mean is observed for Accessibility (A) (4.18) , indicating that respondents particularly recognize the convenience as well as availability of AI-driven_chatbots. Early symptom detection (ESD) also records a relatively high mean of 4.02.			

Table 5: Cronbach's Alpha (Reliability Analysis)

Constructs	Item (s)	Cronbach's Alpha Values	Justification
Early Symptom Detection (ESD)	5	0.882	Excellent
Emotional Responsiveness (ER)	5	0.901	Excellent
Personalization (P)	5	0.874	Good
Accessibility (A)	5	0.861	Good
Psychological Counseling Effectiveness (PCE)	5	0.914	Excellent
Overall Scale	25	0.936	Excellent
The table of alpha coefficients are above the commonly accepted minimum of 0.70, indicating strong internal consistency.			

Table 6: Pearson Correlation Matrix Analysis

Variables	ESD	ER	P	A	PCE
Early Symptom Detection (ESD)	1.000	.68**	.65**	.57**	.74**
Emotional Responsiveness (ER)	.68**	1.000	.71**	.54**	.79**
Personalization (P)	.65**	.71**	1.000	.61**	.81**
Accessibility (A)	.57**	.54**	.61**	1.000	.63**
Psychological Counseling Effectiveness (PCE)	.74**	.79**	.81**	.63**	1.000

Note: $p < 0.01$. The correlation results demonstrate positive associations between all independent variables and psychological counseling effectiveness (PCE). Personalization (P) has the strongest correlation with counseling effectiveness (PCE) ($r = .81$), followed by emotional responsiveness (ER) ($r = .79$) & early symptom detection (ESD) ($r = .74$).

Multiple Regression Analysis

The regression model is:

$$[PCE = \beta_0 + \beta_1 ESD + \beta_2 ER + \beta_3 P + \beta_4 A + \epsilon]$$

Where:

- PCE = Psychological Counseling Effectiveness
- ESD = Early Symptom Detection
- ER = Emotional Responsiveness
- P = Personalization
- A = Accessibility

Table 7: Model Summary

R	R_Square	Adjusted R Square	Std. Err.
0.858	0.737	0.732	0.375

The model explains in the table that approximately 73.70% of the variation in perceived psychological counseling effectiveness (PCE).

Table 8: ANOVA for Regression Model

Model	Sum of Squares	df	Mean Squares	F	Sig. Level
Regression	80.43	4	20.105	142.19	<0.001
Residual	31.65	224	0.142		
Total	112.08	228			

The regression model in the table is statistically significant at the 5% level of significance

Table 9: Regression Coefficients

Predictors	Beta (β) Values	t-values	Sig. Level
Early Symptom Detection (ESD)	0.23	4.31	<0.001
Emotional Responsiveness (ER)	0.27	5.02	<0.001
Personalization (P)	0.36	6.74	<0.001
Accessibility (A)	0.16	3.08	0.002
<i>The strongest predictor is Personalization (P) ($\beta = 0.36$), followed by Emotional Responsiveness ($\beta = 0.27$), Early Symptom Detection (ESD) ($\beta = 0.22$) & Accessibility (A) ($\beta = 0.16$).</i>			

Table 10: Gender-Wise Difference in Counseling Effectiveness (Independent-Samples t-Test)

Groups	Freq.	Mean Values	S.D.	t-value	Sig. Level
Male (M)	121	3.92	0.72	-0.67	0.505
Female (F)	104	3.99	0.73		
<i>An independent samples t-test was utilized as indicated in the table to assess if there were differences based on gender regarding perceived counseling effectiveness (PCE). As shown by the results of the table, PCE does differ between the two gender-wise groups; however, the difference is statistically insignificant.</i>					

Table 11: AI Usage Frequency and Counseling Effectiveness (One-Way ANOVA)

Usage Groups	Freq.	Mean values	S.D.
Frequently	87	4.11	0.64
Occasionally	96	3.92	0.78
Rarely	46	3.75	0.79

Table 12: ANOVA Test Results

Source	Sum of Squares	df	Mean Square	F	Sig. level
Between the Groups	8.74	2	4.371	9.27	<0.001
Within the Groups	106.71	226	0.473		
Total	115.45	228			
<i>The table of ANOVA specifies that, it statistically significant & there are differences in perceived counseling effectiveness as according to frequency of AI's_chatbot usage.</i>					

Table 13: Hypothesis Testing Results

Hypothesis Statements	Statistical Result	Decision
H ₁ 1: Early symptom detection (ESD) has a significant positive relationship with counseling effectiveness (PCE)	$r = .74, p < .001$	H ₁ 1 Supported

H ₁₂ : Emotional responsiveness (ER) has a significant positive relationship with counseling effectiveness (PCE)	$r = .79, p < .001$	H ₁₂ Supported
H ₁₃ : Personalization (P) has a significant positive relationship with counseling effectiveness (PCE)	$r = .81, p < .001$	H ₁₃ Supported
H ₁₄ : Accessibility (A) has a significant positive relationship with counseling effectiveness (PCE)	$r = .63, p < .001$	H ₁₄ Supported
Thus, all four alternative hypothesis are supported as per table results.		

FINDINGS ON THE BASIS OF OBJECTIVES

- **Obj. 1: Early Symptom Detection (ESD)-** There is evidence from this study indicating that earlier symptom recognition is associated with higher levels of counseling effectiveness. The positive correlation coefficient demonstrates an exceptionally high level of positive association.
- **Obj. 2: Emotional Responsiveness (ER)-** Emotional Responsiveness (ER) is positively correlated with Counseling Effectiveness (PCE), which implies that users prefer emotional responses from chatbots to support their needs.
- **Obj. 3: Personalization (P)-** Personalization (P) is the most strongly related to Counseling Effectiveness (PCE) based on having the largest regression coefficient. Thus, personalizing interactions is the most important factor for users' assessment of chatbot effectiveness.
- **Obj. 4: Accessibility (A)-** Accessibility (A) is also significantly positively correlated to Counseling Effectiveness (PCE). Respondents believe that AI-based services provide them with greater convenience and availability.

FINDINGS OF THE STUDY

The study's results demonstrate the potential for AI-Chatbots to be beneficial in improving perceived counseling effectiveness psychologically. In particular, there was a very significant correlation between the user experiencing the Chatbot as personalized and perceiving counseling effectiveness. Specifically, this could be interpreted as the user being most satisfied when they perceive that the Chatbot has responded to them individually and specifically regarding their concerns versus receiving general information. There was also a very significant correlation between emotional responsiveness by the Chatbot and counseling effectiveness. Emotional responsiveness is of specific interest in mental health-related communications, since users may expect to interact with Chatbots in a way which reflects supportiveness and non-judgmentality. The results of this study are congruent with those studies which emphasize the importance of empathetic interactions when designing conversational-agents. Finally, early symptom detection demonstrated a significant positive relationship. AI-Chatbots have the potential to motivate people to think about their emotional states and to determine whether or not they would benefit from seeking the help of a professional. However, this function should always serve as an awareness/education tool and never independently diagnose. Accessibility had the largest mean value. Thus, this supports one of the major arguments made in favor of using AI-Chatbots; namely, easy access to basic mental health information/support. Furthermore, the results suggest that the effectiveness of AI-Chatbots needs to be viewed multi-dimensionally. A Chatbot cannot be said to be "effective" simply because it produces responses which are technically accurate. Rather, a Chatbot will be useful if its responses are relevant, emotionally intelligent/personalized, accessible, safe and refer the user to another resource where necessary. Additionally, the research literature has identified a number of limitations related to engagement. For example, Jabir et al. (2024) found that across all of the reviewed studies examining conversational-agents used in interventions, there was an average attrition rate of 21.84%. The authors argued that blended models which include human-based support were likely to be effective in promoting engagement.

Recommendations

- There is a place for AI chatbots in supporting, but never replacing, the work of psychologists and counselors.
- Chatbots will provide an opportunity to develop possible early indicators that require a mental health professional to assess their situation further, while they cannot diagnose you based on your input.

- The developers must continue to make improvements to the chatbot's ability to understand context and provide unique answers as well as allow testing of the system's empathetic level (ability to recognize emotions), its ability to respond appropriately and trigger specific referral/escalation protocols during high risk conversations.
- Secure, private handling of all user mental health information.
- Similarly, all chatbots created for health applications must go through extensive research prior to use by healthcare professionals in making clinical decisions.
- Evaluation of the effectiveness of AI models across language, culture, generations and methods of communicating with users.
- Furthermore, users need to be aware of what the system can do, how far it is limited and how mental health data will be used and when it will recommend seeking help from a mental health professional.
- Based on the above considerations, AI may have the greatest amount of success when used as part of a comprehensive approach including mental health professionals.

FUTURE RESEARCH

Future research will investigate the long term impact and therapeutic outcome of using AI in a mental health chatbot. The comparison of AI only, Human only and Human + AI counselling methods is another area of study. These studies could be based upon anxiety, depression, stress etc. and various psychological disorders. Additionally future studies need to include multilingual and culturally adaptable chatbots as an avenue for greater inclusivity and access. Future studies should assess the capability of AI to detect crisis situations while ensuring privacy preserving technology and explainable AI capabilities. In order to assess the true efficacy of Chatbot Psychological Support longitudinal and randomized controlled trials are suggested.

CONCLUSION

AI-powered chatbots are an important development in digital mental health support. Their accessibility, conversational capabilities, ability to personalize and potential for early symptom identification make them a promising supplemental tool to mental health services. The current study examines four dimensions of chatbots effectiveness (accessibility; emotional responsiveness; early detection of symptoms; and personalization) through analysis of data from 229 respondents. Statistical results indicate that all four dimensions have significant positive relationships with counseling effectiveness. Among the four dimensions identified as most relevant is personalization and then followed by emotional responsiveness, early detection of symptoms, and accessibility. Thus, users value chatbots that are not only convenient but also responsive to individual concerns and emotional contexts. However, AI chatbots should never be used in place of qualified mental-health professionals. Rather they can be utilized to support awareness; preliminary screening; psycho-education; routine interaction; symptom monitoring; and referral. Human expertise will remain central to clinical decision-making, safety, ethics and care while AI extends access and supports professionals.

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