

Supplementary Information

Effectiveness of AI and Rule-Based Conversational Agents for Depression, Anxiety and Stress: A Meta-Analysis

Saeed Mokhtari Masoumi Alamdarloo¹, , Ali Mirzakhani², , Mohamad Azhdarloo³, Elaheh Haghani-Samani⁴, Abouzar Nazari^{5*}

Affiliations

1. Department of Clinical Psychology, Faculty of Educational Sciences and Psychology, Shiraz University, Shiraz, Iran

Email: saeedshz7694@gmail.com | ORCID: 0000-0003-4298-8267

2. Department of Neuroscience and Addiction Studies, School of Advanced Technologies in Medicine (SATiM), Tehran University of Medical Sciences, Tehran, Iran.

Email: amirzakhani7@yahoo.com ORCID: 0009-0002-5056-2792

3 .MA, Department of Psychology, Marvdasht Branch, Islamic Azad University, Marvdasht, Iran

Email: m.azhdarlo98@gmail.com ORCID: 0000-0002-5461-7511

4. Department of Neuroscience and Addiction Studies, School of Advanced Technologies in Medicine (SATiM), Tehran University of Medical Sciences, Tehran, Iran.

Email: e.haghani2000@gmail.com ORCID: 0009-0006-2372-0117

5. Corresponding author (Department of Public Health, Borujen Faculty of Medical Sciences, Shahrekord University of Medical Sciences, Shahrekord, Iran)

Email: abozarnazari368@gmail.com ORCID: 0000-0003-2155-5438

	Risk of bias domains					
	D1	D2	D3	D4	D5	Overall
Bennion(2020)	+	+	+	+	+	+
Chen (2025)	+	+	+	+	+	+
Chan (2024)	+	+	+	-	-	-
de Graaff (2025)	+	-	+	+	+	-
Chua (2025)	+	+	+	+	+	+
Filippo(2023)	-	+	+	+	+	-
Fitzpatrick (2017)	-	+	+	+	+	-
Fitzsimmons-Craft(2022)	+	+	+	+	+	-
Fulmer (2018)	+	+	✗	+	+	✗
Gan (2025)	+	+	+	+	+	+
Greer (2019)	-	+	+	+	-	-
He (2022)	+	+	+	+	+	-
Jang (2021)	-	+	+	+	+	-
Karkosz (2024)	+	+	+	+	+	+
Kleinau (2024)	+	+	+	+	+	+
Klos (2021)	-	+	✗	+	+	✗
Lee (2025)	+	+	+	+	+	+
Liu (2022)	-	+	✗	+	+	✗
Ly (2017)	-	+	+	+	+	-
Maciejewski (2023)	-	+	✗	+	+	✗
MacNeill (2024)	+	+	+	+	+	+
Maeda (2020)	+	+	+	+	+	+
Nguyen (2024)	+	+	+	+	+	+
Nicol (2022)	+	+	+	+	+	+
Ogawa (2022)	+	+	+	+	+	+
Peuters (2024)	+	+	✗	+	+	✗
Sabour (2023)	+	+	+	+	+	+
Spytska (2025)	+	+	✗	+	+	✗
Suharwardy (2023)	+	+	+	+	+	+
Ulrich (2024)	+	+	+	+	+	+
Ulricha & Lienhard(2024)	+	+	+	+	+	+
Yasukawa (2024)	+	+	✗	+	+	✗
Aguilera (2024)	+	+	✗	+	+	✗
Burton (2016)	-	-	+	-	-	✗
Gardiner (2017)	-	-	+	-	-	✗
Garety (2024)	+	+	+	+	+	+
Johnson (2024)	+	+	+	+	-	-
Kampmann (2016)	+	+	+	+	+	+
Kelly (2025)	+	+	+	+	-	-
Kocur (2021)	+	+	+	-	+	+
Loveys (2022)	+	+	+	+	-	-
Pinto (2015)	+	+	+	+	-	-
Prochaska (2021)	+	+	+	+	+	+
Reilly (2024)	+	+	+	+	+	+
Sadeh-Sharvit (2023)	+	+	+	+	-	-
Six (2025)	+	+	+	+	+	+
Stasinaki (2021)	-	+	+	+	+	-
Zheng (2025)	+	+	+	+	+	+

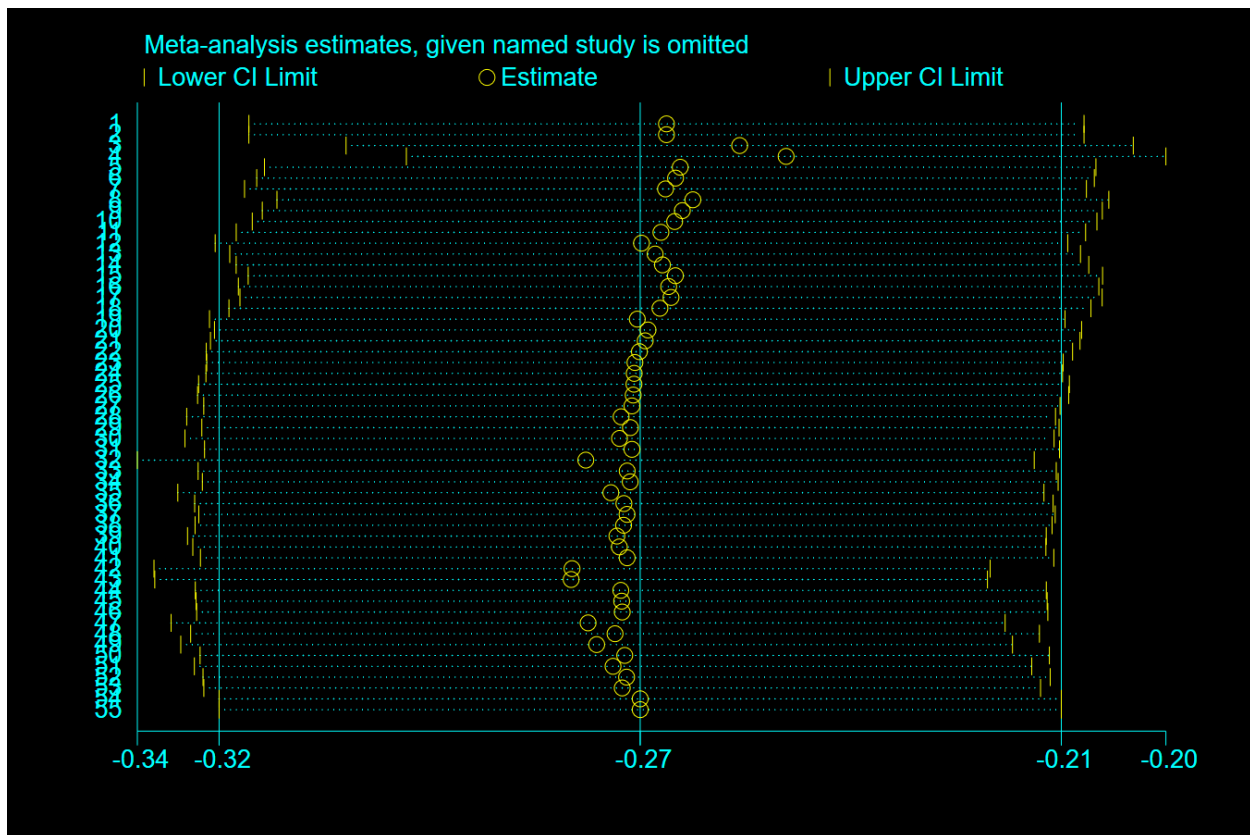
Domains:
 D1: Bias arising from the randomization process.
 D2: Bias due to deviations from intended intervention.
 D3: Bias due to missing outcome data.
 D4: Bias in measurement of the outcome.
 D5: Bias in selection of the reported result.

Judgement
 ✗ High
 - Some concerns
 + Low

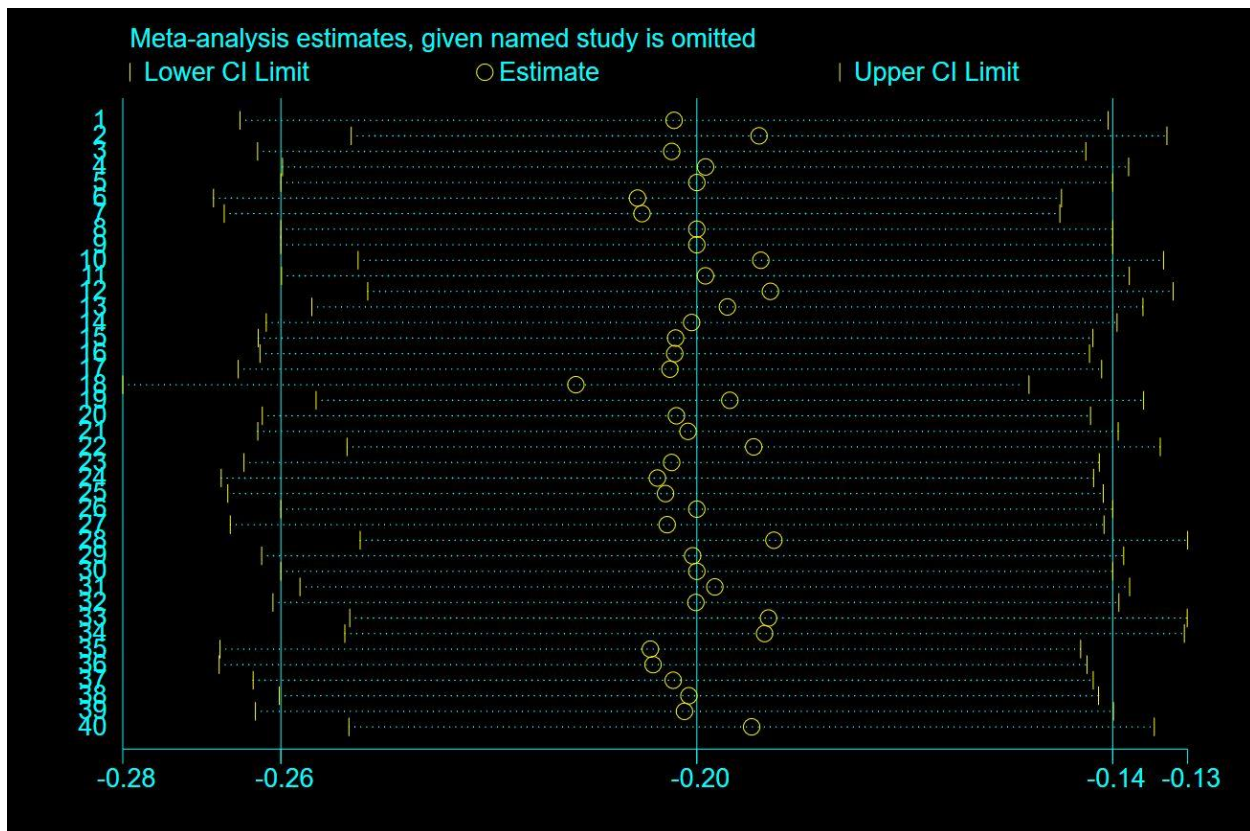
Supplementary Figure 1. Risk Of Bias Assessment

Supplementary Table 1 Summary of Findings and GRADE recommendations

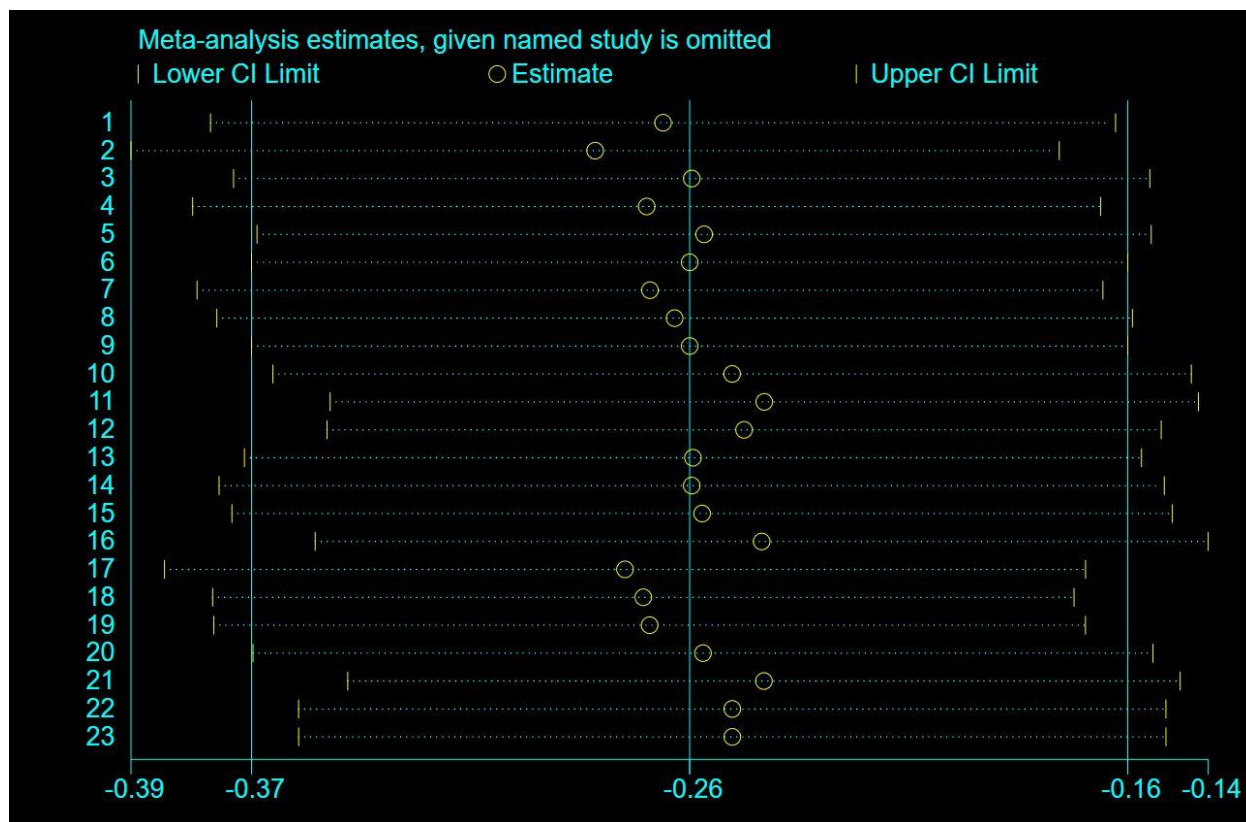
Outcome	No. of Studies	Participants	Relative Effect (SMD, 95% CI)	Absolute Effect	Certainty of Evidence (GRADE)	Comments/Reasons for Downgrading
Depression	36 RCTs (53 reports)	24,265	−0.27 (−0.32 to −0.21)	Moderate symptom reduction (e.g., ~2–3 pts on PHQ-9)	●●●○ Moderate	Downgraded for risk of bias (e.g., unclear blinding, allocation). Heterogeneity and publication bias low.
Anxiety	26 RCTs (38 reports)	3,772	−0.20 (−0.26 to −0.14)	Small symptom reduction (~1.5–2 pts on GAD-7)	●●○○ Low	Downgraded for publication bias (Egger's $p = 0.012$) and some imprecision despite consistent findings.
Stress	16 RCTs (23 reports)	2,477	−0.26 (−0.37 to −0.15)	Small-to-moderate reduction (~2–3 pts on PSS)	●●●○ Moderate	Downgraded for imprecision and limited follow-up data; overall results were consistent and robust.
Depression: Many studies were well-conducted with low heterogeneity ($I^2 = 11.2\%$), but limitations included lack of blinding in some trials and unclear allocation concealment. Anxiety: Despite low heterogeneity, small-study effects were suggested by Egger's test ($p = 0.012$). Effect sizes were modest and study quality varied. Stress: Effect estimates were consistent, but some trials had small sample sizes and high variability in outcome timing. Meta-regression showed no significant moderators.						



Supplementary Figure 2. Sensitivity Analysis of the Pooled Effect Estimates for Depression Outcomes



Supplementary Figure 3. Sensitivity Analysis of the Pooled Effect Estimates for Anxiety Outcomes



Supplementary Figure 4. Sensitivity Analysis of the Pooled Effect Estimates for Stress Outcomes

Supplementary Table 2 Subgroup Analysis of the Effectiveness of Conversational Agent-Based Interventions on Depression

Group	No. of trials	SMD (95% CI)	P-value	I^2 (%)	P-heterogeneity
Depression					
Country					
USA	13	-0.11(-0.21,-0.01)	0.027	0	0.772
China	7	-0.45(-0.60,-0.30)	<0.001	0	0.898
Other	33	-0.28(-0.34,-0.21)	<0.001	5.2	0.383
Blinding					
Single-blind	18	-0.30(-0.37,-0.23)	<0.001	0	0.591
Open-label	28	-0.26(-0.35,-0.16)	<0.001	13.7	0.260
Unclear	7	-0.10(-0.23,0.02)	0.104	0	0.461
Sample size					
≤99	31	-0.28(-0.39,-0.18)	<0.001	0	0.757
100-500	12	-0.33(-0.46,-0.20)	<0.001	55.2	0.011
>500	10	-0.21(-0.29,-0.12)	<0.001	0	0.591
Age					
≤29	19	-0.20(-0.30,-0.09)	<0.001	26.6	0.139
30-49	28	-0.32(-0.39,-0.25)	<0.001	0	0.589
≥50	5	-0.26(-0.55,0.02)	0.069	0	0.764
Sample type					
Clinical	30	-0.28(-0.37,-0.19)	<0.001	35.6	0.029
Nonclinical	23	-0.26(-0.34,-0.18)	<0.001	0	0.920
Therapeutic approach(CBT, ACT, etc.)					
CBT	25	-0.23(-0.34,-0.12)	<0.001	29.2	0.087
Other	28	-0.28(-0.34,-0.22)	<0.001	0	0.730
CA type					
chatbot	34	-0.29(-0.37,-0.20)	<0.001	32.3	0.038
other	19	-0.25(-0.33,-0.16)	<0.001	0	0.939
Outcome Timing(weeks)					
≤4	30	-0.31(-0.40,-0.22)	<0.001	5.9	0.375
>4	23	-0.23(-0.30,-0.16)	<0.001	12	0.295

Heterogeneity source condition :p-value>0.10 AND I^2 <50%

Supplementary Table 3 Subgroup Analysis of the Effectiveness of Conversational Agent-Based Interventions on Anxiety

Group	No. of trials	WMD (95% CI)	P-value	I ² (%)	P-heterogeneity
Anxiety					
Country					
USA	7	-0.10(-0.23,0.02)	0.114	0	0.792
China	8	-0.27(-0.43,-0.10)	0.002	24.2	0.236
Other	23	-0.21(-0.28,-0.13)	<0.001	4.3	0.403
Blinding					
Single-blind	12	-0.26(-0.39,-0.14)	<0.001	36.8	0.096
Open-label	19	-0.19(-0.29,-0.09)	<0.001	0	0.749
Unclear	7	-0.12(-0.25,0.00)	0.054	0	0.450
Sample size					
≤99	21	-0.29(-0.42,-0.16)	<0.001	0.5	0.452
100-500	14	-0.22(-0.31,-0.14)	<0.001	0	0.705
>500	3	-0.08(-0.18,0.00)	0.066	0	0.829
Age					
≤29	15	-0.11(-0.18,-0.03)	0.003	0	0.790
30-49	15	-0.25(-0.35,-0.15)	<0.001	0	0.672
≥50	6	-0.57(-0.82,-0.32)	<0.001	0	0.960
Sample type					
Clinical	19	-0.11(-0.18,-0.04)	0.002	0	0.839
Nonclinical	19	-0.32(-0.42,-0.23)	<0.001	0	0.764
Therapeutic approach(CBT, ACT, etc.)					
CBT	17	-0.09(-0.20,0.00)	0.066	0	0.626
Other	21	-0.23(-0.30,-0.16)	<0.001	1.3	0.442
CA type					
chatbot	30	-0.17(-0.24,-0.11)	<0.001	5.2	0.385
other	8	-0.27(-0.39,-0.14)	<0.001	0	0.582
Outcome Timing(weeks)					
≤4	22	-0.26(-0.36,-0.17)	<0.001	0	0.581
>4	16	-0.15(-0.22,-0.08)	<0.001	2.1	0.429

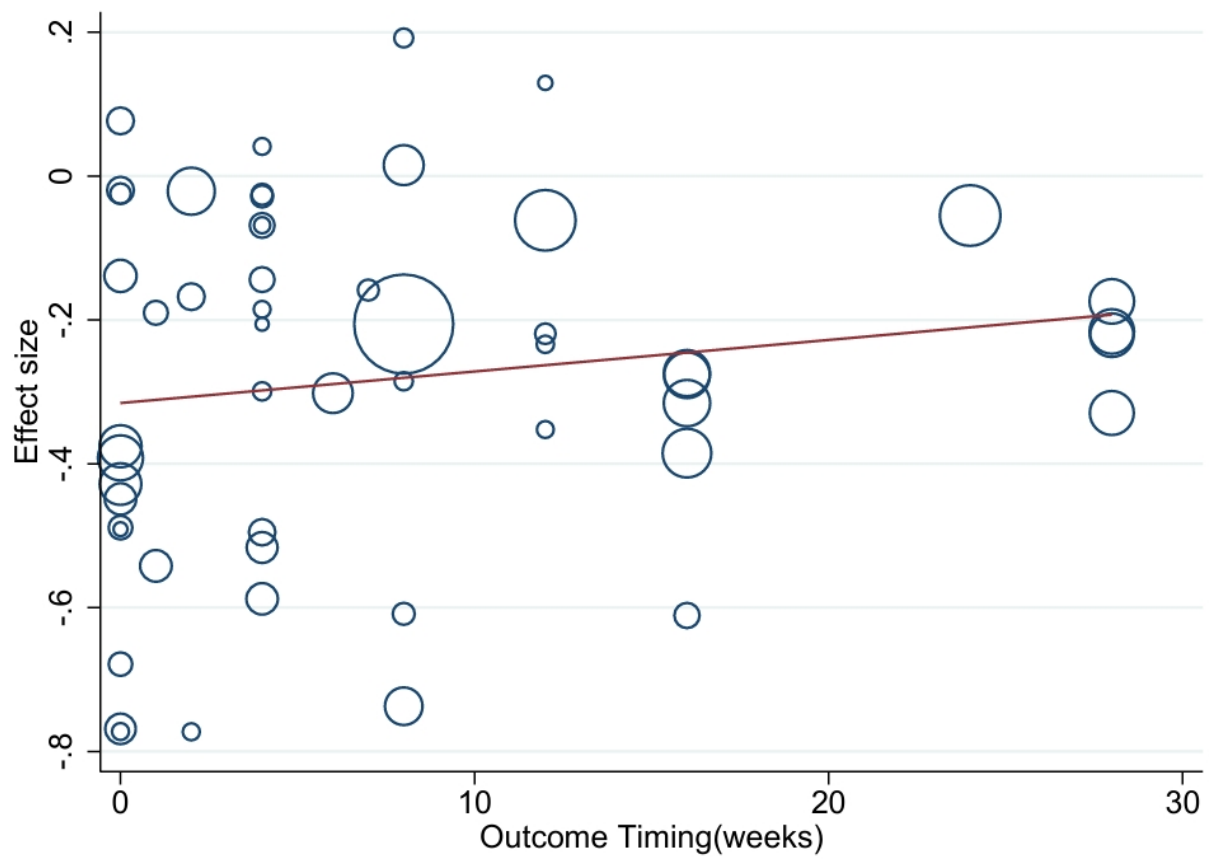
Heterogeneity source condition :p-value>0.10 AND I2<50%

Supplementary Table 4 Subgroup Analysis of the Effectiveness of Conversational Agent-Based Interventions on Stress

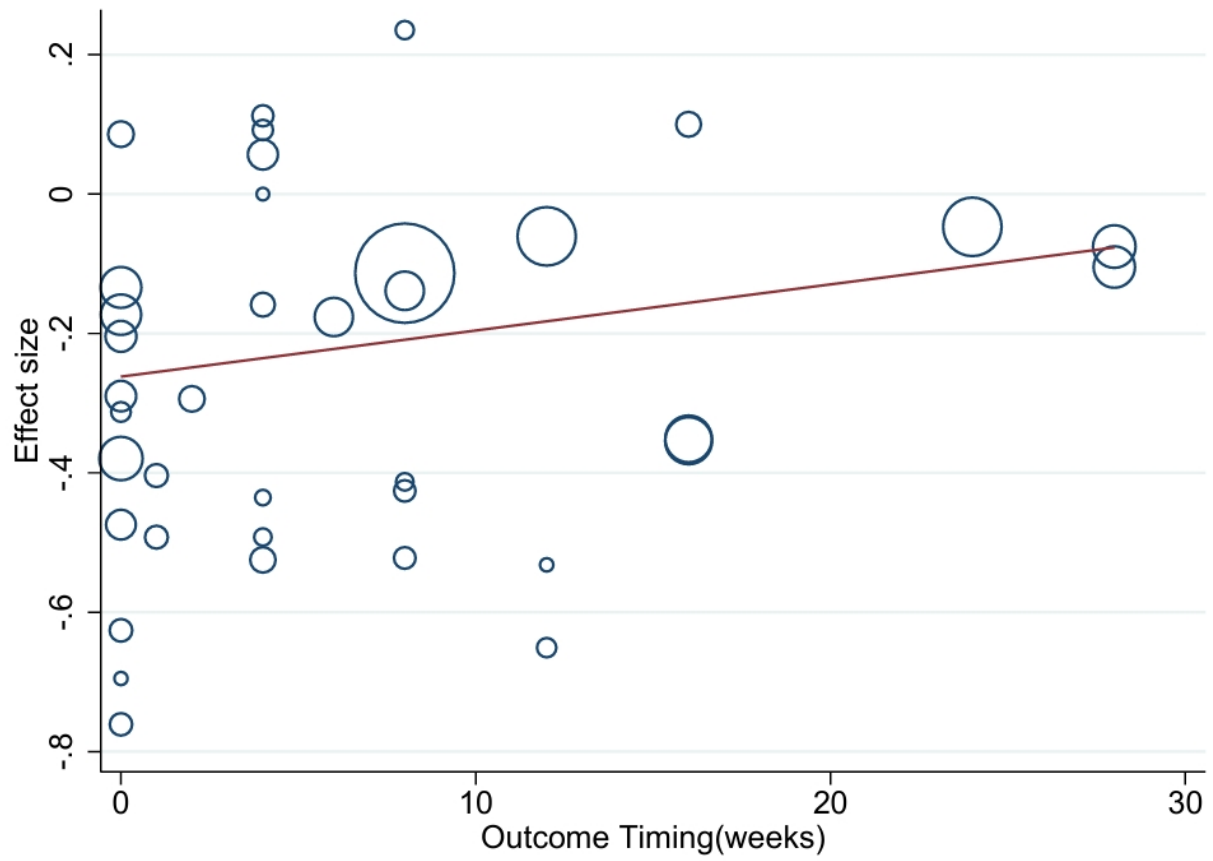
Group	No. of trials	WMD (95% CI)	P-value	I ² (%)	P-heterogeneity
Stress					
Blinding					
Single-blind	7	-0.21(-0.32,-0.10)	0.001	20.2	0.276

Open-label	14	-0.28(-0.45,-0.10)	0.041	34.9	0.096
Unclear	2	-0.77(-1.51,-0.03)	<0.001	19.9	0.264
Sample size					
≤99	15	-0.27(-0.46,-0.09)	0.003	25.6	0.172
100-500	8	-0.25(-0.38,-0.13)	<0.001	46.2	0.072
Age					
≤29	10	-0.13(-0.24,-0.01)	0.031	7.2	0.375
≥30	13	-0.35(-0.47,-0.23)	<0.001	14.8	0.296
Sample type					
Clinical	9	-0.13(-0.27,0.00)	0.052	17.5	0.287
Nonclinical	14	-0.34(-0.46,-0.22)	<0.001	10.6	0.337
Therapeutic approach(CBT, ACT, etc.)					
CBT	8	-0.10(-0.30,0.10)	0.316	19	0.279
Other	15	-0.31(-0.42,-0.19)	<0.001	31.9	0.113
CA type					
chatbot	14	-0.20(-0.34,-0.07)	0.002	22.2	0.213
other	9	-0.32(-0.48,-0.16)	<0.001	39.3	0.106
Outcome Timing(weeks)					
≤4	13	-0.30(-0.47,-0.14)	<0.001	30.5	0.140
>4	10	-0.22(-0.36,-0.09)	0.001	33.9	0.137

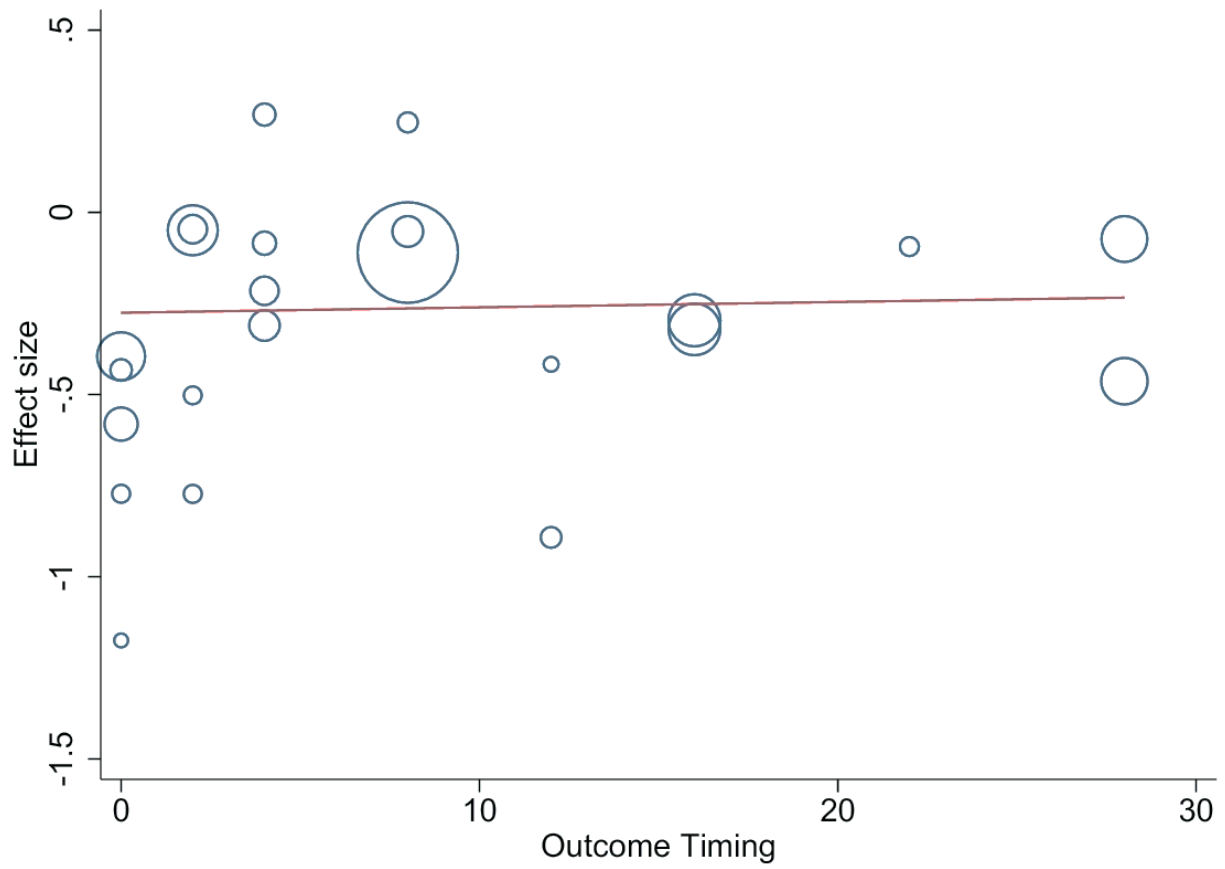
Heterogeneity source condition :p-value>0.10 AND I2<50%



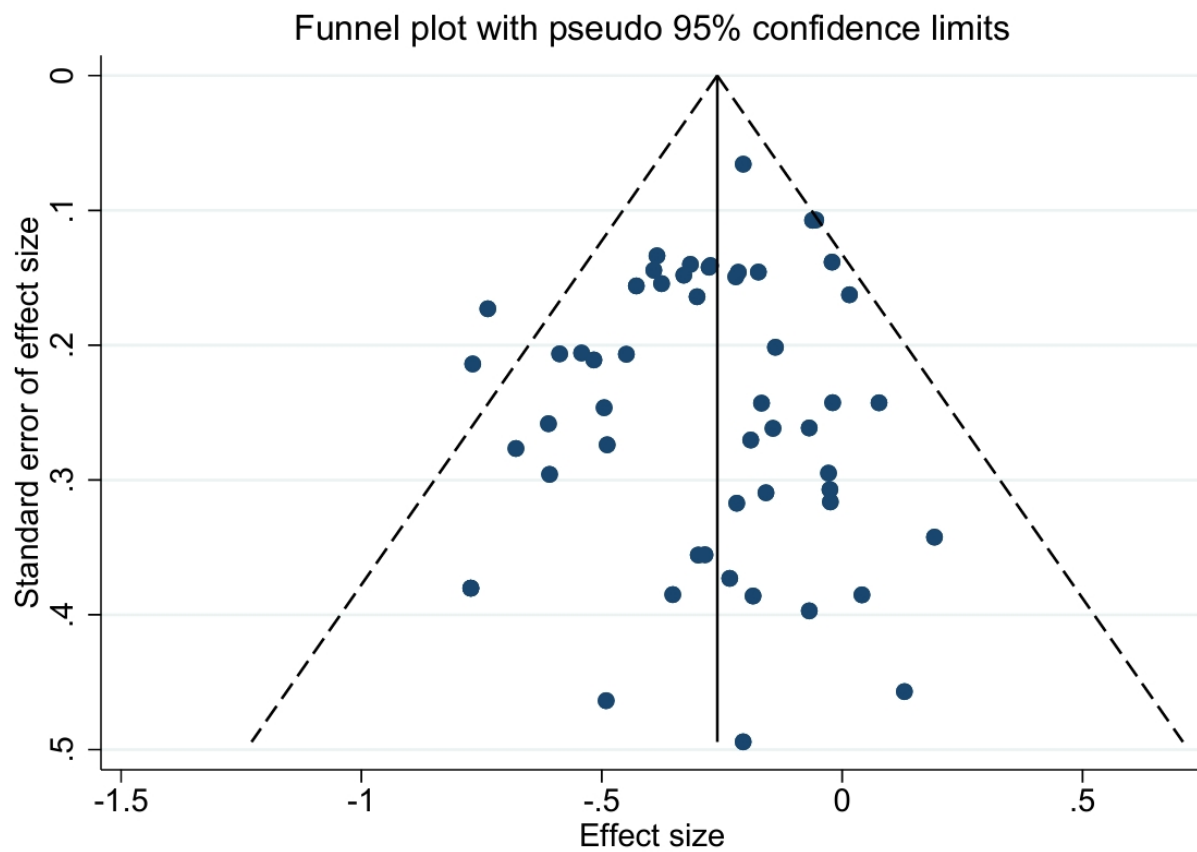
Supplementary Figure 5. Meta-Regression Analysis of Effect Size by Outcome Timing for Depression



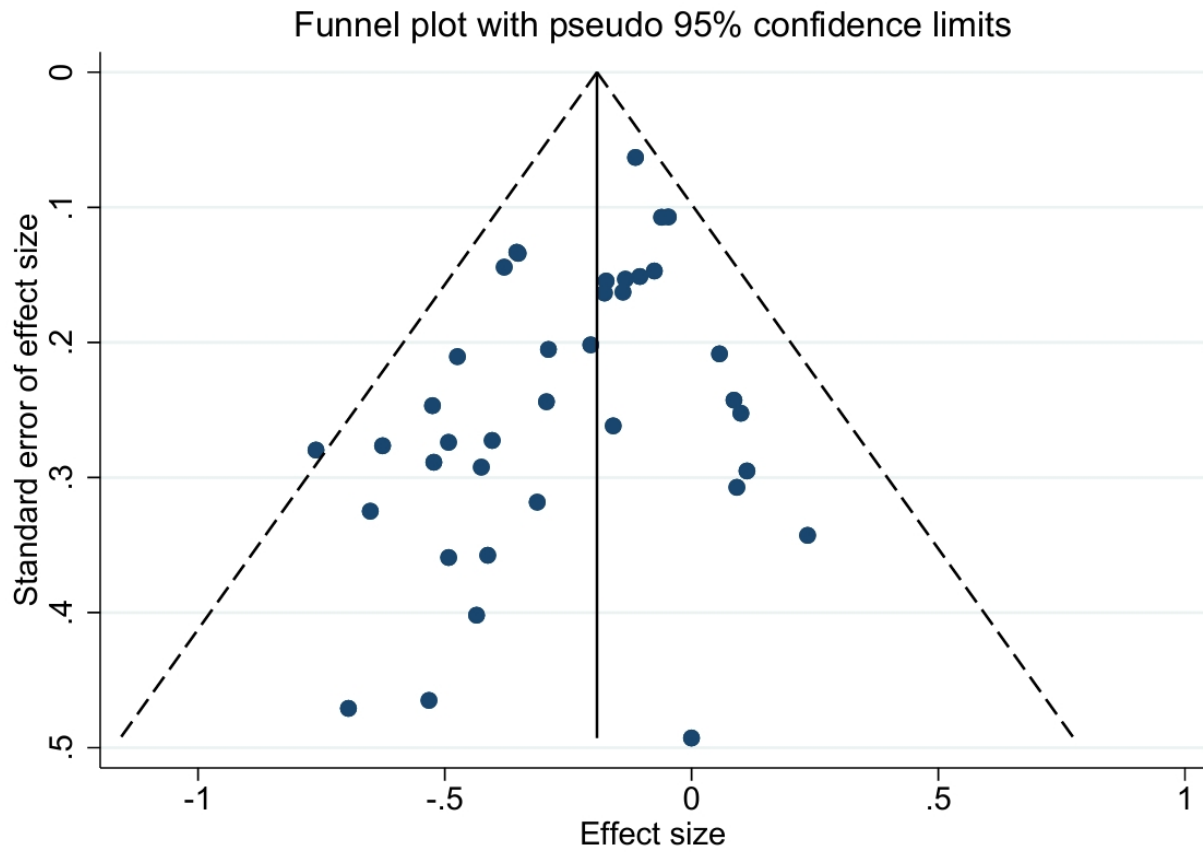
Supplementary Figure 6. Meta-Regression Analysis of Effect Size by Outcome Timing for Anxiety



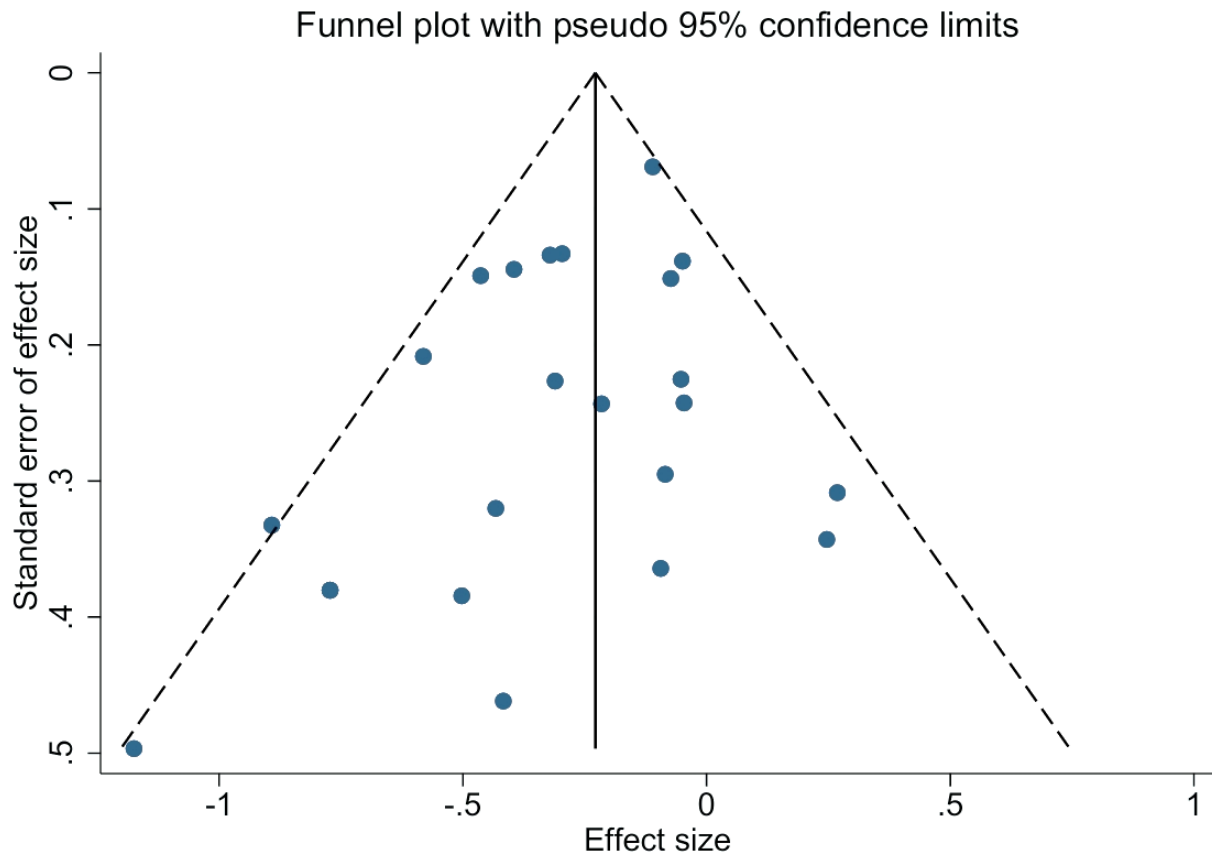
Supplementary Figure 7. Meta-Regression Analysis of Effect Size by Outcome Timing for Stress



Supplementary Figure 8. Funnel Plot Analysis for Depression Trials Included in the Meta-Analysis



Supplementary Figure 9. Funnel Plot Analysis for Anxiety Trials Included in the Meta-Analysis



Supplementary Figure 10. Funnel Plot Analysis for Stress Trials Included in the Meta-Analysis

Supplementary Table 5 PRISMA Checklists

Section and Topic	Item #	Checklist item	Location where item is reported
TITLE			
Title	1	Digital Mental Health Interventions Using AI and Conversational Agents: A Systematic Review and Meta-Analysis of RCTs Targeting Depression, Anxiety, and Stress	page 1.
Abstract	2	Provide a structured summary including background, objectives, data sources, study eligibility criteria, participants and interventions, study appraisal and synthesis methods, results, limitations, conclusions, and implications of key findings. Report whether the review is registered.	Abstract section, page 1.
Rationale	3	Describe the rationale for the review in the context of existing knowledge.	Introduction section, pages 1–2.
Objectives	4	Provide an explicit statement of the objective(s) or question(s) the review addresses.	End of the Introduction section, page 2.
Eligibility criteria	5	Specify the inclusion and exclusion criteria for the review and how studies were grouped for the syntheses.	Methods section, “Inclusion and Exclusion Criteria” subsection, page 3.
Information sources	6	Specify all databases, registers, websites, organisations, reference lists and other sources searched or consulted to identify studies. Specify the date when each source was last searched.	Methods section, “Search Strategy” subsection, page 3.
Search strategy	7	Present the full search strategies for all databases, registers and websites, including any filters and limits used.	Supplementary Material S2
Selection process	8	Specify the methods used to decide whether a study met the inclusion criteria of the review, including how many reviewers screened each record and each full-text report, whether they worked independently, and if applicable, details of automation tools used in the process.	Methods section, “Selection of Studies” subsection, page 4.
Data collection process	9	Specify the methods used to collect data from reports, including how many reviewers collected data from each report, whether they worked independently, any processes for obtaining or confirming data from study investigators, and if applicable, details of automation tools used in the process.	Methods section, “Data Extraction” subsection, page 4.
Data items	10a	List and define all outcomes for which data were sought. Specify whether all results compatible with each outcome domain in each study were sought (e.g. for all measures, time points, analyses), and if not, the methods used to decide which results to collect.	Methods section, “Data Extraction” subsection, page 4.
	10b	List and define all other variables for which data were sought (e.g. participant and intervention characteristics). Describe any assumptions made about any missing or unclear information.	Methods section, “Data Extraction” subsection,

Section and Topic	Item #	Checklist item	Location where item is reported
			page 4.
Study risk of bias assessment	11	Specify the methods used to assess risk of bias in the included studies, including details of the tool(s) used, how many reviewers assessed each study and whether they worked independently, and if applicable, details of automation tools used in the process.	Methods section, "Risk of Bias Assessment" subsection, page 4.
Effect measures	12	Specify for each outcome the effect measure(s) (e.g., mean difference) used in the synthesis or presentation of results.	Methods section, "Statistical Analysis" subsection, pages 4–5.
Synthesis methods	13a	Describe the processes used to decide which studies were eligible for each synthesis (e.g. tabulating the study characteristics and comparing against planned groups for each synthesis).	Methods section, "Data Extraction" and "Statistical Analysis", pages 4–5. Studies grouped by outcome (depression, anxiety, stress); characteristics described in Table 1 and Results section
	13b	Describe any methods required to prepare the data for presentation or synthesis, such as handling of missing summary statistics, or data conversions.	Page 5, "Statistical Analysis" subsection. SDs calculated from SEs, confidence intervals, or interquartile ranges. Data from graphs extracted using GetData Graph Digitizer; SDchange formula used
	13c	Describe any methods used to tabulate or visually display results of individual studies and syntheses.	Figures 4–6 (Forest plots), Figure 3 (RoB), funnel plots (Supplementary Material S7), and GRADE table (Supplementary Material S4) were used for visual presentation
	13d	Describe any methods used to synthesize results and provide a rationale for the choice(s). If meta-analysis was performed, describe the model(s), method(s) to identify the presence and extent of statistical heterogeneity, and software package(s) used.	Page 5, "Statistical Analysis". Random-effects model used to account for heterogeneity (expected due to differences in interventions/populations). Heterogeneity assessed

Section and Topic	Item #	Checklist item	Location where item is reported
			via I^2 and residual I^2 . Analysis done in Stata 21
	13e	Describe any methods used to explore possible causes of heterogeneity among study results (e.g. subgroup analysis, meta-regression).	Subgroup analyses (by age, region, blinding, CA type, etc.) and meta-regression conducted and reported in main Results and Supplementary Materials S6 and S8
	13f	Describe any sensitivity analyses conducted to assess robustness of the synthesized results.	Leave-one-out sensitivity analyses conducted and results reported in Supplementary Material S5
Reporting bias assessment	14	Describe any methods used to assess risk of bias due to missing results in a synthesis (arising from reporting biases).	Funnel plot visual inspection and Egger's test used for each outcome; reported in main Results and Supplementary Material S7
Certainty assessment	15	Describe any methods used to assess certainty (or confidence) in the body of evidence for an outcome.	GRADE approach applied independently by two reviewers. Results reported in text and in Supplementary Material S4 (SoF table)
Study selection	16a	Describe the results of the search and selection process, from the number of records identified to the number of studies included, ideally using a flow diagram.	Results section, page 6, and Figure 1 (PRISMA flow diagram) in Final Article.docx
	16b	Cite studies that might appear to meet the inclusion criteria, but which were excluded, and explain why.	18 full texts excluded for reasons like ineligible intervention/design; reasons summarized in the text on page 6

Section and Topic	Item #	Checklist item	Location where item is reported
Study characteristics	17	Cite each included study and present its characteristics.	Results section, page 7 and Table 1 (study characteristics summary); citations [19–60] cover all included studies
Risk of bias in studies	18	Present assessments of risk of bias for each included study.	Results section, pages 8–9 and Figure 3. Full results detailed in Supplementary Material S3
Results of individual studies	19	For all outcomes, present summary statistics for each group and effect estimates with precision (e.g. confidence intervals).	Forest plots (Figures 4–6) show individual study effects and summary stats. Additional numerical results detailed in text and figures
Results of syntheses	20a	For each synthesis, briefly summarise the characteristics and risk of bias among contributing studies.	Described under Depression, Anxiety, Stress Outcomes in Results; risk of bias and heterogeneity discussed (pages 8–10)
	20b	Present results of all statistical syntheses conducted. If meta-analysis was done, present summary estimates, precision, and measures of statistical heterogeneity.	Summary estimates for all three outcomes reported with SMD, 95% CI, I^2 (pages 8–10); forest plots (Figures 4–6) illustrate meta-analyses
	20c	Present results of investigations into possible causes of heterogeneity among study results.	Subgroup analysis results are presented in the Results and detailed in Supplementary Material S6
	20d	Present results of sensitivity analyses conducted to assess robustness of the synthesized results.	Sensitivity analyses described in Results and detailed in Supplementary Material S5
Reporting biases	21	Present assessments of risk of bias due to missing results (arising from reporting biases) for each synthesis.	Egger's test results reported in Results; full

Section and Topic	Item #	Checklist item	Location where item is reported
			details in Supplementary Material S7 (funnel plots)
Certainty of evidence	22	Present assessments of certainty (or confidence) in the body of evidence for each outcome.	GRADE assessments reported in Results and summarized in Supplementary Material S4 (Summary-of-Findings table)
Discussion	23a	Provide a general interpretation of the results in the context of other evidence.	Discussion section, pages 11–13. Compares findings with prior digital mental health interventions, confirms small-to-moderate effects, discusses alignment with previous meta-analyses
	23b	Discuss any limitations of the evidence included in the review.	Discussion section, page 13. Notes moderate-to-high RoB in some studies, heterogeneity in CA design, follow-up limitations
	23c	Discuss any limitations of the review processes used.	Pages 13–14. Notes exclusion of non-English studies, possible publication bias, and reliance on short-term effects
	23d	Discuss implications of the results for practice, policy, and future research.	Pages 14–15. Highlights scalability and utility in LMICs, calls for qualitative and long-term evaluation, ethical considerations
Registration and protocol	24a	Provide registration information for the review, including register name and registration number, or state that the review was not registered.	Abstract and Methods, page 2 and page 3. Registered with PROSPERO:

Section and Topic	Item #	Checklist item	Location where item is reported
			CRD420251059269
	24b	Indicate where the review protocol can be accessed, or state that a protocol was not prepared.	Protocol not publicly accessible; mentioned only that it was registered on PROSPERO
	24c	Describe and explain any amendments to information provided at registration or in the protocol.	Not reported; no amendments specified
Support	25	Describe sources of financial or non-financial support for the review, and the role of the funders or sponsors in the review.	Funding statement, page 15: "This study received no specific funding from any public, commercial, or not-for-profit funding body."
Competing interests	26	Declare any competing interests of review authors.	Competing Interests, page 15: "The authors declare that they have no competing interests."
Availability of data, code and other materials	27	Report which of the following are publicly available and where they can be found: template data collection forms; data extracted from included studies; data used for all analyses; analytic code; any other materials used in the review.	Availability statement, page 15: "All data generated or analyzed during this study are included in this published article and its supplementary files." Additional data available upon request

From: Page MJ, McKenzie JE, Bossuyt PM, Boutron I, Hoffmann TC, Mulrow CD, et al. The PRISMA 2020 statement: an updated guideline for reporting systematic reviews. *BMJ* 2021;372:n71. doi: 10.1136/bmj.n71. This work is licensed under CC BY 4.0. To view a copy of this license, visit <https://creativecommons.org/licenses/by/4.0/>

Supplementary Table 6 Search strings and databases

Pubmed:	
# Concept 1: Artificial Intelligence (Comprehensive & Updated)	("Artificial Intelligence"[MeSH Terms] OR "artificial intelligence"[tiab] OR "AI"[tiab] OR "machine learning"[tiab] OR "deep learning"[tiab] OR "neural network"[tiab] OR "natural language processing"[tiab] OR "predictive analytics"[tiab] OR "predictive modeling"[tiab] OR "robot*"[tiab] OR "social bot*"[tiab] OR "dialogue system*"[tiab] OR "conversational agent*"[tiab] OR "conversational bot*"[tiab] OR "conversational system*"[tiab] OR "conversational interface*"[tiab] OR "chatbot*"[tiab] OR "chat bot*"[tiab] OR "chatterbot*"[tiab] OR "chatter bot*"[tiab] OR "chat-bot*"[tiab] OR "smartbot*"[tiab] OR "smart bot*"[tiab] OR "smart-bot*"[tiab] OR "virtual coach*"[tiab] OR "virtual agent*"[tiab] OR "embodied agent*"[tiab] OR "relational agent*"[tiab] OR "avatar*"[tiab] OR "virtual character*"[tiab] OR "animated character*"[tiab] OR "virtual human*"[tiab] OR "virtual assistant*"[tiab] OR "digital assistant*"[tiab] OR "counseling agent*"[tiab])
AND	
# Concept 2: Digital Mental Health Interventions	("mobile health"[tiab] OR mHealth[tiab] OR "digital health"[tiab] OR "mobile app"[tiab] OR app[tiab] OR smartphone[tiab] OR internet[tiab] OR online[tiab] OR web-based[tiab] OR "e-health"[tiab] OR telehealth[tiab] OR telemedicine[tiab] OR "virtual therapy"[tiab] OR "digital intervention"[tiab])
AND	
# Concept 3: Mental Health Promotion (Depression, Anxiety, Stress)	("mental health"[MeSH Terms] OR "mental health"[tiab] OR "mental wellbeing"[tiab] OR depression[MeSH Terms] OR depression[tiab] OR depressive[tiab] OR anxiety[MeSH Terms] OR anxiety[tiab] OR anxious[tiab] OR stress[MeSH Terms] OR stress[tiab] OR "psychological distress"[tiab] OR "mental disorder"[tiab] OR "mood disorder"[tiab] OR "emotional wellbeing"[tiab])
AND	
# Concept 4: Study Design (RCTs and controlled studies)	("randomized controlled trial"[Publication Type] OR "randomized controlled trial"[tiab] OR "randomised controlled trial"[tiab] OR RCT[tiab] OR "controlled trial"[tiab] OR "clinical trial"[Publication Type] OR "clinical trial"[tiab] OR trial[tiab])
AND	
# Limits	(english[Language]) ("2010/01/01"[Date - Publication] : "2025/12/31"[Date - Publication])

Scopus:	TITLE-ABS-KEY("artificial intelligence" OR AI OR "machine learning" OR "deep learning" OR "neural network" OR "natural language processing" OR "predictive analytics" OR "predictive modeling" OR robot* OR "social bot*" OR "dialogue system*" OR "conversational agent*" OR "conversational bot*" OR "conversational system*" OR "conversational interface*" OR chatbot* OR "chat bot*" OR chatterbot* OR "chatter bot*" OR "chat-bot*" OR smartbot* OR "smart bot*" OR "smart-bot*" OR "virtual coach*" OR "virtual agent*" OR "embodied agent*" OR "relational agent*" OR avatar* OR "virtual character*" OR "animated character*" OR "virtual human*" OR "virtual assistant*" OR "digital assistant*" OR "counseling agent*")
AND	TITLE-ABS-KEY("mobile health" OR mHealth OR "digital health" OR "mobile app" OR "mobile application" OR app OR apps OR smartphone OR "smart phone" OR "mobile phone" OR tablet OR internet OR online OR "web-based" OR "web based" OR "e-health" OR eHealth OR telehealth OR "tele-health" OR telemedicine OR "remote therapy" OR "remote consultation" OR "digital therapy" OR "virtual therapy" OR "virtual care" OR "digital intervention" OR "digital program" OR "technology-assisted intervention" OR "internet-delivered" OR "digital counseling" OR "online counseling" OR "digital coaching" OR "self-guided intervention" OR "guided self-help" OR "automated intervention")
AND	TITLE-ABS-KEY("mental health" OR "mental wellbeing" OR depression OR depressive OR anxiety OR anxious OR stress OR "psychological distress" OR "mental disorder" OR "mood disorder" OR "emotional wellbeing")
AND	TITLE-ABS-KEY("randomized controlled trial" OR "randomised controlled trial" OR RCT OR "controlled trial" OR "clinical trial" OR trial)
AND	
LIMITS	(LIMIT-TO(LANGUAGE, "English")) (PUBYEAR > 2009 AND PUBYEAR < 2026)

Web of Science	TS=("artificial intelligence" OR AI OR "machine learning" OR "deep learning" OR "neural network" OR "natural language processing" OR "predictive analytics" OR "predictive modeling" OR robot* OR "social bot*" OR "dialogue system*" OR "conversational agent*" OR "conversational bot*" OR "conversational system*" OR "conversational interface*" OR chatbot* OR "chat bot*" OR chatterbot* OR "chatter bot*" OR "chat-bot*" OR smartbot* OR "smart bot*" OR "smart-bot*" OR "virtual coach*" OR "virtual agent*" OR "embodied agent*" OR "relational agent*" OR avatar* OR "virtual character*" OR "animated character*" OR "virtual human*" OR "virtual assistant*" OR "digital assistant*" OR "counseling agent*")
AND	TS=("mobile health" OR mHealth OR "digital health" OR "mobile app" OR "mobile application" OR app OR apps OR smartphone OR "smart phone" OR "mobile phone" OR tablet OR internet OR online OR "web-based" OR "web based" OR "e-health" OR eHealth OR telehealth OR "tele-health" OR telemedicine OR "remote therapy" OR "remote consultation" OR "digital therapy" OR "virtual therapy" OR "virtual care" OR "digital intervention" OR "digital program" OR "technology-assisted intervention" OR "internet-delivered" OR "digital counseling" OR "online counseling" OR "digital coaching" OR "self-guided intervention" OR "guided self-help" OR "automated intervention")
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AND	
LIMITS	(LIMIT-TO(LANGUAGE, "English")) (PUBYEAR > 2009 AND PUBYEAR < 2026)