Iran J Psychiatry 2026; 21: 1: 93-113

Review Article

The Effects of Cognitive Behavioral Therapy Interventions on Emotional Disorders in Iranian Studies: A Systematic Review and Meta-Analysis

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Abstract

Objective: This study systematically integrates and reviews the results of Iranian studies on the effectiveness of cognitive behavioral therapy (CBT) for emotional disorders.
Method: To ensure a comprehensive review, relevant Iranian studies from 2001 to 2024 were identified from databases such as Google Scholar, Web of Science, Scopus, PubMed, SID, Noormags, and MagIran using keywords including CBT, emotional disorders, anxiety, depression, OCD, PTSD, and stress.
Results: Based on the inclusion criteria, 93 effect sizes from 65 Iran-based studies were selected for analysis. The random-effects model revealed a significant overall effect size of CBT on emotional disorders, with $g = 1.07$, $p < 0.001$, and a 95% confidence interval ranging from 0.95 to 1.20. The primary analysis indicated that CBT effectively improved various emotional disorders, including anxiety ($g = 1.04$), depression ($g = 1.09$), OCD ($g = 1.19$), PTSD ($g = 0.39$), and stress ($g = 1.27$). Subgroup analysis showed no significant gender differences in the effectiveness of CBT, whereas meta-regression revealed a significant association between the effect size of CBT and the age of Iranian participants.
Conclusion: The CBT intervention method has been an effective treatment for emotional disorders and has significantly improved anxiety, depression, OCD, and PTSD in Iranian populations; however, its effect on stress was not statistically significant in this study.

Key words: *Cognitive Behavioral Therapy; Emotional Disorders; Evidence-Based Interventions; Meta-Analysis; Psychological Disorders; Systematic Review*

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Article Information:
Received Date: 2025/05/03, Revised Date: 2025/08/08, Accepted Date: 2025/08/10

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Emotional disorders encompass mood and anxiety disorders such as major depressive disorder, generalized anxiety disorder (GAD), post-traumatic stress disorder (PTSD) and obsessive-compulsive disorder (OCD), as classified in the DSM-5 (1). These disorders are often associated with emotional dysregulation, which involves difficulties in modulating negative emotions (such as sadness, anxiety, and fear), coupled with maladaptive patterns like pervasive avoidance, rumination, and heightened physiological reactivity (2). They are highly prevalent and recurrent, contributing substantially to disability and socioeconomic costs (3). In 2019, approximately 4.05% of the global population, about 301 million people, were affected by anxiety disorders, representing an increase of over 55% compared to 1990 (4). Most researchers agree that the spectrum of emotional disorders includes unipolar mood and anxiety disorders, encompassing social anxiety disorder, PTSD, OCD, panic disorder, and GAD (1).

Stress- and anxiety-related disorders are among the most common and costly mental health conditions (5). GAD is characterized by excessive, persistent, and unrealistic worry about everyday matters. This worry may be multifaceted, including financial, family, health, and future concerns. It is excessive, difficult to control, and is often accompanied by various nonspecific psychological and physical symptoms. Excessive worry is the central feature of generalized anxiety disorder (6) and causes significant impairment during childhood, adolescence, and adulthood (7, 8). Individuals with anxiety disorders often experience fear, intense anxiety, and behavioral disturbances, frequently accompanied by muscle tension and ringing in the ears as responses to perceived threats or avoidance behaviors. Depressive disorders involve mood regulation difficulties characterized by episodes of depression, irritability, and mania (1). Chronic mental disorders reduce quality of life and impair social, occupational, and academic functioning, necessitating simultaneous attention to symptom reduction and functional improvement (9). Notably, the high comorbidity rate of anxiety and depressive disorders, reported to be as high as 80%, underscores the necessity for comprehensive therapeutic approaches (10).

Cognitive behavioral therapy (CBT) is considered the gold standard for treating anxiety disorders, and it is widely regarded as a first-line, evidence-based treatment for mental health conditions, particularly emotional disorders such as anxiety and depression (11). This structured approach focuses on identifying and modifying maladaptive cognitive and behavioral patterns by addressing negative beliefs and dysfunctional behaviors. Through training in emotion regulation and stress management skills, CBT enhances patients' psychological functioning and overall quality of life (12). In CBT-based psychotherapy, patients are guided to recognize distorted thinking patterns and ineffective behaviors. Cognitive techniques focus on beliefs and thought processes, and behavioral techniques concentrate on actions and behaviors that interact with mental processes (13). Studies have investigated factors predicting response to CBT to optimize treatment personalization and enhance its efficacy (12). The effectiveness of this therapeutic approach has been widely confirmed through extensive research (14). Studies have demonstrated that psychotherapy, particularly CBT, is an effective treatment for emotional disorders in primary care settings (15). A meta-analysis by Li *et al*. (16) confirmed the effectiveness of CBT in reducing depression, anxiety, and stress in pregnant women. Furthermore, a meta-analysis by Van Loenen *et al*. (17) demonstrated that virtual reality exposure-based CBT is effective in treating severe anxiety disorders, OCD, and PTSD. A systematic review by Öst *et al*. (18) also reported the positive impact of CBT in treating PTSD in adults, with effects lasting up to six months after treatment. In Iran, studies have confirmed the effectiveness of CBT in treating emotional disorders. A meta-analysis on Iranian patients with chronic disorders showed that CBT had a significant effect in reducing symptoms of depression and anxiety (19). Additionally, Akbari and Hosseini (20), in a meta-analysis of third-wave behavioral therapies conducted between 2001 and 2017, reported that metacognitive therapies were effective in reducing depressive symptoms.

Despite extensive evidence supporting the effectiveness of CBT, research findings remain scattered and at times contradictory. Such inconsistencies are often attributable to differences in sample characteristics, research methodologies, and assessment tools. For example, while most studies have reported significant benefits of CBT in treating anxiety and depressive disorders, some have found varying effectiveness depending on the type of disorder or the therapeutic modality applied (17, 21, 22). Given these gaps in the literature, and considering the growing application of third-wave CBT approaches and the increasing body of related research in Iran, as well as the fact that most previous meta-analyses have focused solely on single disorders or short-term studies, a comprehensive meta-analysis is warranted. The present study aims to systematically review evidence from 2001 to 2024 regarding the effectiveness of CBT for the most common emotional disorders (anxiety, stress, PTSD, depression, and OCD) in the Iranian population. In addition, it analyzes treatment outcomes by disorder type and examines gender as a moderating variable, with the ultimate goal of informing the development of more precise and effective clinical interventions in Iran.

Materials and Methods

The present study is a systematic review and meta-analysis of Iranian studies that investigated the effectiveness of CBT for emotional disorders. In this study, the PRISMA (23) checklist was used as the

preferred guideline for reporting systematic reviews and meta-analyses**.**

Search Strategy

All available articles in international databases (Google Scholar, PubMed, Web of Science (ISI), and Scopus) and national databases (SID, Noormags, and MagIran) were systematically searched. The search was conducted up to December 2024 and included studies published between 2001 and 2024. Main keywords, based on the independent variable and various dependent outcomes, were: "cognitive-behavioral intervention" OR "CBT" AND "emotional disorders" OR "anxiety" OR "depression" OR "stress" OR "Obsessive-Compulsive Disorder" OR "post-traumatic stress disorder" AND "Iran" OR "Iranian". To ensure comprehensive coverage, search strategies were adapted to each database, and MeSH terms were used where applicable (especially in PubMed). Additionally, reference lists of selected articles were manually reviewed to identify further relevant studies. Duplicates were removed, and the remaining articles were screened for eligibility based on their titles and abstracts.

Inclusion and Exclusion Criteria

Inclusion criteria for the present study were: a. applying quantitative methods to investigate the effectiveness of CBT on emotional disorders in the Iranian population; b. provision of sufficient data to calculate the effect size; c. availability of full text in accessible databases; and d. articles published in Persian and English. e. The articles must include both control and experimental groups, along with pre- and post-intervention assessments. Studies with methodological flaws and without full text were rigorously excluded from the study. Two researchers independently and meticulously reviewed the titles and abstracts of the studies to ensure each met the inclusion criteria. In cases of uncertainty about excluding an article or disagreements in data extraction, the full text was examined, and the opinion of a third researcher was sought. Any remaining disagreements were resolved through discussion and consensus to ensure a thorough and consistent review process.

Data Extraction

A checklist of research project specifications developed by Mesrabadi (24) was used to collect and extract key information from the primary studies. The extracted items included the research title, first author, year of publication, study location, dependent variable(s), type(s) of disorder, participants' gender, study design, control group condition, assessment tools, effect sizes, validity and reliability of the instruments, target population, sample size, and statistical values or test results required for effect size calculation. All included studies investigated the effectiveness of CBT on emotional disorders.

Quality Assessment

The quality of the studies was independently assessed by two reviewers, with disagreements resolved through consensus or consultation with a third researcher. For randomized controlled trials (RCTs), the Cochrane Risk of Bias tool, version 2 (RoB 2) was applied, evaluating domains such as randomization, allocation concealment, blinding, completeness of outcome data, and selective reporting. Each study was classified as having low risk, some concerns, or high risk of bias (25). Quasi-experimental studies were assessed using the JBI critical appraisal checklist, which considers criteria such as clarity of group definition, adequacy of sample size, control of confounders, validity of instruments, and appropriateness of statistical analysis. Studies were categorized as high, moderate, or low quality according to JBI guidelines (26). The use of these two validated tools according to study design ensured methodological rigor and transparency, while separate reporting of RCTs and quasi-experimental studies enhanced the reproducibility and reliability of the findings.

Statistical Analysis

A random-effects model was used due to expected significant heterogeneity. Hedges' g index was chosen to calculate effect sizes and correct small sample bias (27). Effect sizes of 0.8, 0.5, and 0.2 were interpreted as large, moderate, and small effects (28). Mean standard error was calculated assuming a normal distribution. Publication bias was assessed using funnel plots and the fail-safe N (FSN) statistic. The Chi-square test ($P = 0.01$) and I^2 index were used to determine heterogeneity levels, which were interpreted as low, moderate, and high at 25%, 50%, and 75%, respectively. In this study, the I^2 value exceeded 75%. Heterogeneity was further analyzed using meta-regression and subgroup analyses. After searching based on inclusion and exclusion criteria, 65 studies were reviewed, and 93 effect sizes were included in the meta-analysis prior to sensitivity analysis. The study selection process is illustrated in Figure 1.

Ethical Consideration

All procedures performed in studies involving human participants were in accordance with the 1964 Helsinki declaration and its later amendments or comparable ethical standards.

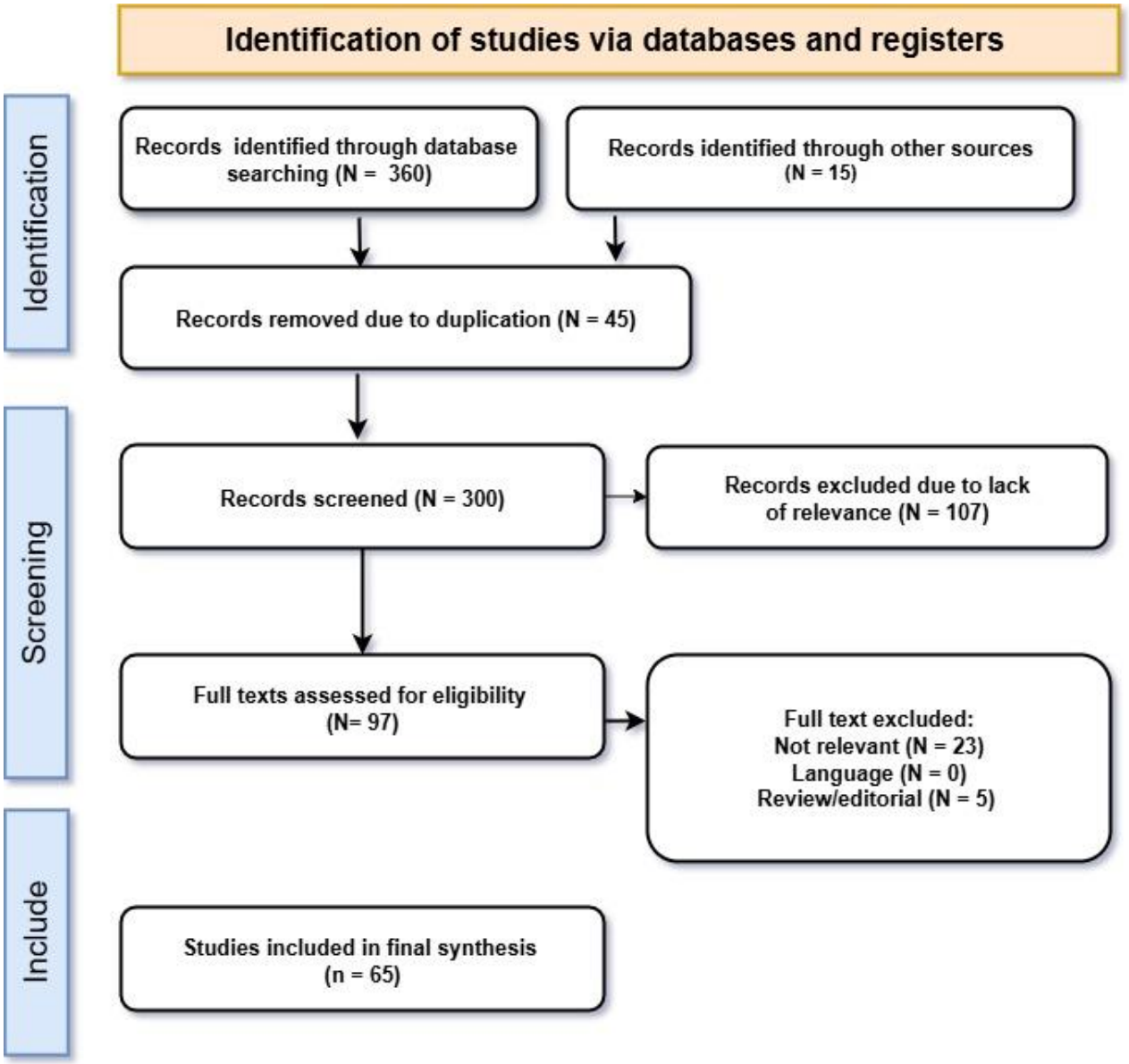

Figure 1. Flow Chart of the Search Phases to Select Studies for Systematic Review Based on the PRISMA Statement

Results

Characteristics of Included Studies

According to the inclusion and exclusion criteria, 65 studies were included, yielding 93 effect sizes due to multiple dependent variables. Funnel plot sensitivity analysis identified 20 outliers, leaving 73 effect sizes for final analysis. Of these, 16 were randomized clinical trials (RCTs) and 49 quasi-experimental studies. The studies assessed CBT effects on depression (29), anxiety (27), stress (6), PTSD (3), and OCD (8), with a total of 1,886 participants. Sample sizes in intervention and control groups ranged from 8 to 20. All studies were conducted in Iran between 2001 and 2024 across diverse populations. Regarding gender, 13 studies included only females, 9 only males, and 51 both. Outcome measurement instruments are presented in Table 1. All studies, regardless of design, included a control group with pre- and post-test assessments per eligibility criteria. The main reason most studies were rated as moderate quality was the inability to assign blinding scores due to their interventional nature.

Figure 2 shows the effect size of CBT on emotional disorders like anxiety, depression, stress, OCD, and PTSD across studies. Each point represents a study's standardized effect size with a 95% confidence interval. The plot indicates that most studies found a significant positive effect of CBT in reducing symptoms.

Table 1. General Characteristics of Studies Included in the Systematic Review

First Author (Year)	N (CBT / Control)	Mean Age or Age Range	Gender	Study Design	Control Group Condition	Assessment Tools	Type of Disorder	Effect Size	Overall Quality
Abdolghaderi, et al. (2014) (29)	10 / 10	18 / 60	Male & Female	Quasi-experimental (pre–post with control group)	No intervention	DASS-21	Anxiety Depression Stress	1.07* 0.57* 0.69*	Moderate
Akbari, et al. (2009) (30)	10 / 10	20 to 32	Male	Quasi-experimental (pre–post with control group)	No intervention	Beck Depression	Depression	0.60*	Moderate
Akhundi, et al. (2024) (31)	15 / 15	27	Female	Quasi-experimental (pre–post and follow-up with control group)	No intervention	Beck Depression Beck Anxiety	Anxiety Depression	0.82* 1.56*	Moderate
Alamdarloo, et al. (2019) (32)	12 / 12	Adults	Male	Quasi-experimental (pre–post and follow-up with control group)	No intervention	DASS-21	Anxiety Stress	1.71* 2.05 ■	Moderate
Amir Soleimani and Derakhshani (2024) (33)	15 / 15	9	Male	RCT (pre–post with control group)	Waitlist	LSAS-SR	Anxiety	14.93 ■	Some concerns
Arab and Mohammadi (2023) (34)	16 / 16	Aged	Male & Female	Quasi-experimental (pre–post with control group)	No intervention	Death Anxiety Scale (DAS)	Anxiety	1.80*	Moderate
Baghooli, Kermani, et al. (2020) (35)	25 / 25	55	Male & Female	Quasi-experimental (pre–post and follow-up with control group)	No intervention	Beck Depression BDI-II	Depression	1.08*	Moderate
Bahadorzade, et al. (2015) (36)	20 / 20	20 to 40	Male	Quasi-experimental (pre–post with control group)	No intervention	Zung Self-Rating Anxiety Scale (SAS)	Anxiety	1.43*	Moderate
Bahrami, et al. (2019) (37)	10 / 10	8 to 12	Female	Quasi-experimental (pre–post and follow-up with control group)	No intervention	ASEBA	Anxiety depression	1.09* 2.18	Moderate
Darvishi, et al. (2021) (38)	12 / 12	50 to 55	Male	Quasi-experimental (pre–post with control group)	Waitlist	Beck Anxiety Beck Depression	Anxiety Depression	1.91* 1.37*	Moderate

First Author (Year)	N (CBT / Control)	Mean Age or Age Range	Gender	Study Design	Control Group Condition	Assessment Tools	Type of Disorder	Effect Size	Overall Quality
Daryabeigi, et al. (2020) (39)	16 / 16	7 to 10	Male	Quasi-experimental (pre–post with control group)	No intervention	ASEBA / Child Behavior Checklist (CBCL)	Depression	0.78*	Moderate
							Depression	0.72*	
Daryayelal and Akbari (2022) (40)	10 / 10	18 to 26	Male & Female	Quasi-experimental (pre–post and follow-up with control group)	No intervention	Social Phobia Inventory – SPIN	Depression	0.72*	High quality
							PTSD	1.06*	
							Stress	1.45*	
Dehghani (2009) (41)	12 / 12	18 to 50	Female	Quasi-experimental (pre–post with control group)	No intervention	SCL-90-R	Depression	1.05*	Moderate
Dehshiri (2012) (42)	10 / 10	27	Male & Female	Quasi-experimental (pre–post with control group)	Waitlist	State-Trait Anxiety Inventory (STAI)	Anxiety	2.37 ■	Moderate
Elahi, et al. (2023) (43)	25 / 25	20 to 50	Male	Quasi-experimental (pre–post with control group)	No intervention	DASS-21	Anxiety	0.84*	Moderate
							Depression	1.65*	
							Stress	2.25 ■	
Ershadi Manesh (2021) (44)	32 / 27	13	Female	RCT (pre–post and follow-up with control group)	No intervention	Beck Depression (BDI-II)	Depression	7.6 ■	Some concerns
Esmaili, et al. (2013) (45)	15 / 15	No reported	Male& Female	Quasi-experimental (pre–post with control group)	No intervention	Beck Depression (BDI-II)	Depression	1.21*	Moderate
Gharashi and Moheb (2018) (46)	15 / 15	7 to 11	Male& Female	Quasi-experimental (pre–post with control group)	No intervention	HADS	Depression	1.92*	Moderate
							anxiety	1.23*	

First Author (Year)	N (CBT / Control)	Mean Age or Age Range	Gender	Study Design	Control Group Condition	Assessment Tools	Type of Disorder	Effect Size	Overall Quality
Hamedi, et al. (2020) (47)	15 / 15	9 to 15	Male & Female	RCT (pre–post with control group)	No intervention	State-Trait Anxiety Inventory (STAI) & Children's Depression Inventory (CDI)	Anxiety Depression	1.35* 1.17*	Some concerns
Hamid, et al. (2011) (48)	15 / 15	Adult	Female	Quasi-experimental (pre–post with control group)	No intervention	Beck Depression (BDI-II)	Depression	1.91*	Moderate
Heidarian Fard, et al. (2016) (49)	8 / 8	20 to 29	Female	RCT (pre–post and follow-up with control group)	No intervention	Social Anxiety Questionnaire (SAQ)	Anxiety	0.31*	Moderate
Hesar, et al. (2014) (50)	30 / 30	15 to 18	Female	Quasi-experimental (pre–post with control group)	No intervention	DAS-21	Anxiety Depression OCD	0.61* 0.08* 0.69*	Moderate
Hosseini Nik and Eslamzade (2019) (51)	15 / 15	20 to 40	Female	Quasi-experimental (pre–post with control group)	No intervention	Mississippi PTSD Scale	PTSD	0.32*	Moderate
Isvand, et al. (2024) (52)	15 / 15	18 to 50	Female	Quasi-experimental (pre–post with control group)	No intervention	Perceived Stress Scale (PSS)	Stress	1.44*	Moderate
Kamran, et al. (2024) (53)	15 / 15	15	Female	Quasi-experimental (pre–post and follow-up with control group)	No intervention	Zaleski's Future Anxiety Scal (FAS)	Anxiety Stress	10.46 ■ 3.80	High quality
Keyvani and Jahanian (2022) (54)	15 / 15	17 to 22	Male & Female	Quasi-experimental (pre–post with control group)	No intervention	Friedman-Test-Anxiety-Questionnaire.	Anxiety Anxiety	1.69* 1.43	High quality
Khaledian, et al. (2014) (55)	12 / 12	Adult	Not reported	RCT (pre–post with control group)	No intervention	Beck Depression (BDI-II)	Depression	1.53*	Some concerns

First Author (Year)	N (CBT / Control)	Mean Age or Age Range	Gender	Study Design	Control Group Condition	Assessment Tools	Type of Disorder	Effect Size	Overall Quality
Kochak Ni (2022) (56)	20 / 20	Adult	Male& Female	Quasi-experimental (pre–post with control group)	No intervention	Perceived Stress Scale (PSS)	Stress	0.66*	Moderate
Mami (2015) (57)	8 / 8	18 to 31	Male& Female	Quasi-experimental (pre–post with control group)	No intervention	Beck Depression (BDI-II)	Depression	1.76*	Moderate
Mehrara, et al. (2018) (58)	15 / 15	9 to 12	Male& Female	RCT (pre–post with control group)	No intervention	Child State-trait anxiety questionnaire (CSTA)	Anxiety Anxiety	0.89* 0.75*	Some concerns
Mikaeili Barzili, et al. (2011) (59)	15 / 15	18 to 50	Male & Female	RCT (pre–post with control group)	No intervention	Yale- Brown Obsessive Compulsive Scale (YBOCS)	OCD	3.02 ■	Some concerns
Moghtader, et al. (2014) (60)	10 / 10	16 to 40	Female	Quasi-experimental (pre–post with control group)	No intervention	Beck Anxiety Inventory BAI	Anxiety	5.58 ■	Moderate
Mohammadian Moradkhah, et al. (2022) (61)	12 / 12	Adult	Female	Quasi-experimental (pre–post with control group)	No intervention	Beck Depression & Yale–Brown Obsessive Compulsive Scale	Depression OCD	0.52* 1.71*	Moderate
Mohammadnejad, et al. (2022) (62)	12 / 12	20 to 45	Female	Quasi-experimental (pre–post and follow-up with control group)	Waitlist	Yale- Brown Obsessive Compulsive Scale (YBOCS)	OCD	1.58*	Moderate
Mohammad Zadeh Farhani, et al. (2018) (63)	17 / 17	6 to 12	Male & Female	RCT (pre–post with control group)	Waitlist	CSI-4	Anxiety	0.33*	Moderate
Monirpour and Hasani Semnani (2019) (64)	11 / 11	Adult	Female	Quasi-experimental (pre–post and follow-up with control group)	Waitlist	Yale- Brown Obsessive Compulsive Scale (YBOCS)	OCD	1.99*	Moderate

First Author (Year)	N (CBT / Control)	Mean Age or Age Range	Gender	Study Design	Control Group Condition	Assessment Tools	Type of Disorder	Effect Size	Overall Quality
Narimani (2014) (65)	20 / 20	25	Female	Quasi-experimental (pre–post with control group)	No intervention	Generalized Anxiety Disorder Questionnaire -IV(GAD-Q-IV)	Anxiety	0.73*	Moderate
Nikmorad, et al. (2013) (66)	15 / 15	Adult	Male	RCT (pre–post with control group)	No intervention	PCL(Posttraumatic Stress Disorder Checklist)	PTSD	0.09 *	Some concerns
Nikneshan, et al. (2020) (67)	8 / 8	5 to 10	Male & Female	Quasi-experimental (pre–post and follow-up with control group)	No intervention	Parenting Stress Index – Short Form (PSI-SF)	Stress	1.90*	Moderate
Norozi and Maniea (2017) (68)	20 / 20	18 to 27	Male Female	Quasi-experimental (pre–post with control group)	No intervention	Social Interaction Anxiety Scale (SIAS)	Anxiety	6.80 ■	Moderate
Nourisaeed, et al. (2022) (69)	15 / 15	30 to 60	Male & Female	RCT (pre–post with control group)	No intervention	Perceived Stress Questionnaire – PSQ	Stress	1.92*	Some concerns
Omidi, et al. (2008) (70)	10 / 10	18 to 45	Male & Female	RCT (pre–post with control group)	No intervention	Structured Clinical Interview for Depression – SCID-I and BSI-53)	OCD Anxiety Depression	0.60* 1.30* 5.05 ■	Some concerns
Orvati Aziz (2021) (71)	12 / 12	18 to 40	Male & Female	Quasi-experimental (pre–post with control group)	Waitlist	Hamilton Anxiety Rating Scale (HRSA)	Anxiety	2.58 ■	Moderate
Parvandi, et al. (2022) (72)	18 / 18	8 to 10	Male & Female	Quasi-experimental (pre–post and follow-up with control group)	No intervention	Separation Anxiety Assessment Scale Parent Version (SAS-P)	Anxiety	1.81*	Moderate

First Author (Year)	N (CBT / Control)	Mean Age or Age Range	Gender	Study Design	Control Group Condition	Assessment Tools	Type of Disorder	Effect Size	Overall Quality
Pasandian and Hashemi razini (2021) (73)	16 / 16	30	Male & Female	Quasi-experimental (pre–post with control group)	No intervention	Maudsley's Obsessive-Compulsive Inventory	OCD	1.84*	Moderate
Pirkalani, et al. (2019) (74)	15 / 15	30 to 50	Female	Quasi-experimental (pre–post with control group)	No intervention	DASS-21	Depression	0.37*	Moderate
Rajabi, et al. (2018) (75)	10 / 10	13 to 15	Female	Quasi-experimental (pre–post and follow-up with control group)	Introductory session only	Children's Depression Inventory (CDI)	Depression	11.90 ■	moderate
Ranjbar, et al. (2010) (76)	16 / 16	Adult	Male& Female	RCT (pre–post and follow-up with control group)	No intervention	Beck Depression	Depression	0.44*	Some concerns
Rashed, et al. (2020) (77)	5 / 7	18 to 50	Female	Quasi-experimental (pre–post with control group)	No intervention	Beck Depression	Depression	0.90*	Moderate
Rezaie, et al. (2013) (78)	14 / 14	20 to 45	Female	RCT (pre–post with control group)	No intervention	SCL-90-R	Depression	1.72*	Some concerns
Sadr Mohammadi, et al. (2019) (79)	15 / 15	18 to 55	Male& Female	Quasi-experimental (pre–post and follow-up with control group)	No intervention	Beck Depression BDI-II	Depression	0.97*	Moderate
Saleh, et al. (2015) (80)	15 / 15	12	Male& Female	Quasi-experimental (pre–post with control group)	No intervention	Mood and Feelings Questionnaire (MFQ)	Depression	1.78*	Moderate
Salehi, et al. (2014) (81)	10 / 10	Adult	Male& Female	Quasi-experimental (pre–post with control group)	No intervention	Moudzly Obsessive-Compulsive Inventory	OCD OCD	1.30* 1.16*	Moderate
Samavatyan, et al. (2021) (82)	8 / 8	7 to 11	Female	Quasi-experimental (pre–post and follow-up with control group)	No intervention	ASEBA	Anxiety Depression	0.28* 2.40 ■	High quality

First Author (Year)	N (CBT / Control)	Mean Age or Age Range	Gender	Study Design	Control Group Condition	Assessment Tools	Type of Disorder	Effect Size	Overall Quality
Sharifi, et al. (2021) (83)	13 / 13	12 to 16	Male & Female	Quasi-experimental (pre–post with control group)	No intervention	Child Abnormal Symptoms Inventory (CSI-4)	Anxiety	6.41■	Moderate
Shaygan Manesh, et al. (2018) (84)	20 / 20	25	Male& Female	Quasi-experimental (pre–post with control group)	No intervention	Social Anxiety Test of SPIN	Anxiety	1.97*	Moderate
Soleymani, et al. (2015) (85)	14 / 13	18 to 30	Male & Female	RCT (pre–post with control group)	No intervention	DASS-42	Depression Anxiety Stress	1.73* 4.31 ■ 3.53 ■	Some concerns
Soleimani Sefat, et al. (2017) (86)	15 / 15	15 to 18	Male	Quasi-experimental (pre–post with control group)	No intervention	Beck Depression (BDI-II)	Depression	0.33*	Moderate
Sotodeh, et al. (2011) (87)	14 / 14	27 to55	Male& Female	RCT (pre–post with control group)	No intervention	Beck Depression (BDI-II)	Depression	0.44*	Some concerns
Tajery (2016) (88)	15 / 15	Adult	Male	Quasi-experimental (pre–post and follow-up with control group)	Waitlist	Beck Depression / Beck Anxiety	Depression Anxiety	1.76* 1.03*	Moderate
Torshizi, et al. (2021) (89)	15 / 15	18 to 40	Female	Quasi-experimental (pre–post with control group)	Waitlist	Yale- Brown Obsessive Compulsive Scale (YBOCS)	OCD	0.66*	Moderate
Varmzyar, et al. (2021) (90)	15 / 15	36	Male & Female	RCT (pre–post and follow-up with control group)	Waitlist	Social Phobia Inventory (SPIN)	Anxiety	0.62*	Some concerns
Yoosefi, et al. (2019) (91)	12 / 12	32	Female	RCT (pre–post and follow-up with control group)	No intervention	Beck Depression BDI-II	Depression Anxiety	3.93 ■ 1.82*	Some concerns
Zamani, et al. (2020) (92)	15 / 15	4 to 6	Male & Female	Quasi-experimental (pre–post with control group)	No intervention	Spence Children's Anxiety Scale (SCAS)	Anxiety Depression	0.37* 1.42*	Moderate
Zargar, et al. (2014) (93)	15 / 15	19 to 30	Male& Female	RCT (pre–post with control group)	No intervention	SAQ–Najarian & Davoudi	Anxiety	2.27 ■	Some concerns

* = Significant effect size, ■ = Outlier effect size, OCD = Obsessive-Compulsive Disorder, PTSD = Post-Traumatic Stress Disorder, RCT = Randomized Controlled Trial, Waitlist = participants were scheduled to receive the CBT intervention after the trial, No intervention = participants did not receive the CBT intervention during the trial.

Study name	Outcome	Std diff in means	Standard error	Variance	Lower limit	Upper limit	Z-Value	p-Value
Abdolghaderi-1	anxiety	1.072	0.478	0.229	0.135	2.009	2.241	0.025
Abdolghaderi-2	depression	0.570	0.456	0.208	-0.324	1.464	1.249	0.212
Abdolghaderi-3	stress	0.688	0.460	0.212	-0.214	1.590	1.494	0.135
Akbari	depression	0.603	0.457	0.209	-0.293	1.499	1.318	0.187
Akhundi (2024)	anxiety	0.823	0.380	0.145	0.078	1.568	2.164	0.030
Akhundi -2(2024)	depression	1.562	0.417	0.174	0.744	2.379	3.744	0.000
Alamdarloo (2019)	anxiety	1.711	0.477	0.228	0.776	2.646	3.586	0.000
Alamdarloo -2(2019)	stress	2.052	0.504	0.254	1.064	3.041	4.069	0.000
Amir Soleimani (2024)	anxiety	14.929	1.962	3.848	11.084	18.774	7.611	0.000
Arab (2023)	anxiety	1.803	0.419	0.176	0.981	2.625	4.300	0.000
Baghooli Kermani	depression	1.083	0.303	0.092	0.489	1.677	3.576	0.000
Bahadorzade (2015)	anxiety	1.426	0.354	0.125	0.732	2.120	4.027	0.000
Bahrami (2019)	depression	2.185	0.461	0.213	1.281	3.090	4.736	0.000
Bahrami -2(2019)	anxiety	1.091	0.479	0.230	0.152	2.031	2.276	0.023
Darvishi (2021)	anxiety	1.914	0.467	0.218	1.000	2.829	4.101	0.000
Darvishi (2021)-2	depression	1.369	0.406	0.165	0.574	2.164	3.375	0.001
Daryabeigi (2020)	depression	0.781	0.367	0.135	0.062	1.500	2.129	0.033
Daryabeigi-2 (2020)	depression	0.717	0.365	0.133	0.002	1.432	1.966	0.049
DaryLaleh -1(2022)	depression	0.723	0.516	0.266	-0.288	1.735	1.402	0.161
DaryLaleh -2 (2022)	ptsd	1.106	0.537	0.288	0.054	2.158	2.060	0.039
DaryLaleh-3 (2022)	stress	1.449	0.562	0.316	0.348	2.551	2.580	0.010
Dehghani (2009)	depression	1.105	0.438	0.192	0.246	1.964	2.520	0.012
Dehshiri (2012)	anxiety	2.370	0.435	0.189	1.517	3.222	5.449	0.000
Elahi (2023)-1	anxiety	0.838	0.295	0.087	0.259	1.416	2.839	0.005
Elahi (2023)-2	depression	1.656	0.328	0.107	1.013	2.298	5.052	0.000
Elahi (2023)-3	stress	2.253	0.362	0.131	1.544	2.962	6.231	0.000
Ershadi Manesh (2021)	depression	7.611	0.339	0.115	6.946	8.275	22.445	0.000
Esmaili1 (2013)	depression	1.207	0.397	0.158	0.429	1.985	3.039	0.002
Gharashi (2018)	depression	1.928	0.442	0.195	1.061	2.794	4.362	0.000
Gharashi-2(2018)	anxiety	1.229	0.398	0.159	0.449	2.010	3.087	0.002
Hamedi(2020)	anxiety	1.352	0.405	0.164	0.558	2.145	3.340	0.001
Hamedi-2(2020)	depression	1.174	0.395	0.156	0.399	1.949	2.969	0.003
Hamid (20110	depression	1.918	0.441	0.195	1.053	2.783	4.347	0.000
Heidarian Fard (2016)	anxiety	0.306	0.318	0.101	-0.317	0.930	0.963	0.336
Hesar (2014)	anxiety	0.606	0.264	0.070	0.089	1.124	2.296	0.022
Hesar -2(2014)	depression	0.089	0.316	0.100	-0.531	0.709	0.282	0.778
Hesar-3 (2014)	obsession	0.688	0.325	0.106	0.050	1.325	2.113	0.035
Hosseini Nik (2019)	ptsd	0.317	0.362	0.131	-0.392	1.026	0.876	0.381
Isvand (2024)	stress	1.436	0.410	0.168	0.633	2.239	3.507	0.000
kamandloo	depression	0.898	0.383	0.147	0.147	1.649	2.343	0.019
Kamran (2024)	anxiety	10.466	1.400	1.959	7.723	13.209	7.478	0.000
Kamran -2(2024)	stress	3.804	0.612	0.374	2.604	5.003	6.216	0.000
Keyvani (2022)	anxiety	1.682	0.425	0.180	0.849	2.514	3.958	0.000
Keyvani-2 (2022)	anxiety2	1.434	0.409	0.168	0.632	2.236	3.503	0.000
Khaledian (2014)	depression	1.538	0.465	0.216	0.627	2.449	3.310	0.001
Kochak Nia (2022)	stress	0.660	0.325	0.105	0.024	1.297	2.034	0.042
Mami (2015	depression	1.763	0.555	0.309	0.674	2.851	3.174	0.002
Mehrara (2018)	anxiety	0.895	0.383	0.147	0.144	1.645	2.336	0.019
Mehrara-2 (2018)	anxiety	0.751	0.378	0.143	0.010	1.491	1.988	0.047
Mikaeili Barzili (2011)	obsession	3.023	0.534	0.286	1.975	4.070	5.656	0.000
Moghtader (2014)	anxiety	5.580	0.989	0.978	3.641	7.518	5.641	0.000
Mohamadisadr	depression	0.967	0.386	0.149	0.211	1.724	2.507	0.012
Mohamadzade farahani	anxiety	0.329	0.345	0.119	-0.347	1.006	0.954	0.340
Mohammadian Moradkhah (2022)	depression	0.519	0.415	0.172	-0.294	1.333	1.251	0.211
Mohammadian-2 Moradkhah (2022)	obsession	1.709	0.477	0.228	0.774	2.644	3.583	0.000
Monirpour (2019)	obsession	1.991	0.521	0.272	0.969	3.013	3.818	0.000
Narimani (2014)	anxiety	0.736	0.327	0.107	0.096	1.377	2.253	0.024
Nikmorad(2013	ptsd	0.087	0.365	0.133	-0.629	0.803	0.239	0.811
Nikneshan (2020)	stress	1.905	0.603	0.363	0.723	3.086	3.160	0.002
Norozi (2017)	anxiety	6.882	0.832	0.692	5.251	8.512	8.273	0.000
Nourisaeed (2022	stress	1.926	0.442	0.195	1.061	2.792	4.360	0.000
Omidi (2008)	anxiety	1.303	0.492	0.242	0.338	2.268	2.647	0.008
Omidi -3(2008)	obsession	0.600	0.457	0.209	-0.296	1.496	1.312	0.190
Omidi-2 (2008)	depression	5.050	0.915	0.838	3.256	6.844	5.518	0.000
Orvati Aziz (2021)	anxiety	2.576	0.552	0.305	1.494	3.658	4.665	0.000
Parvandi (2022)	anxiety	1.812	0.396	0.157	1.036	2.588	4.578	0.000
Pasandian (2021)	obsession	1.838	0.422	0.178	1.012	2.665	4.360	0.000
Pirkalani (2019)	anxiety	0.375	0.368	0.136	-0.347	1.097	1.018	0.309
Rajabi (2018)	depression	11.953	1.942	3.772	8.147	15.760	6.155	0.000
Ranjbar (2010)	depression	0.440	0.343	0.118	-0.233	1.113	1.280	0.200
Rashed (2020)	depression	0.902	0.429	0.184	0.062	1.742	2.105	0.035
Rezaei (2018)	depression	1.554	0.466	0.217	0.641	2.467	3.336	0.001
Saleh (2015)	depression	1.785	0.432	0.186	0.939	2.631	4.134	0.000
Salehi (2014)	obsession	1.294	0.348	0.121	0.612	1.975	3.720	0.000
Salehi -2(2014)	obsession	1.165	0.484	0.234	0.217	2.113	2.408	0.016
Samavatyan (2021)	anxiety	0.281	0.502	0.252	-0.704	1.266	0.559	0.576
Samavatyan (2021)-2	depression	2.397	0.655	0.430	1.112	3.681	3.657	0.000
Sharifi (2021)	anxiety	6.407	0.971	0.943	4.503	8.310	6.597	0.000
shayeghan manash	anxiety	1.972	0.386	0.149	1.217	2.728	5.116	0.000
Soleimani Sefat (2017)	depression	0.334	0.368	0.135	-0.387	1.054	0.907	0.364
soleymani	depression	1.727	0.371	0.137	1.001	2.454	4.662	0.000
soleymani1	anxiety	4.307	0.576	0.332	3.178	5.437	7.476	0.000
soleymani3	stress	3.529	0.506	0.256	2.538	4.520	6.979	0.000
Sotodeh (1390)	depression	0.447	0.383	0.146	-0.303	1.197	1.167	0.243
Tajery (2016)	anxiety	1.033	0.389	0.151	0.272	1.795	2.658	0.008
Tajery-2 (2016)	depression	1.759	0.430	0.185	0.916	2.602	4.091	0.000
Torshizi (2021)	obsession	0.662	0.375	0.141	-0.073	1.398	1.767	0.077
Varmzyar (2021)	anxiety	0.621	0.324	0.105	-0.014	1.256	1.918	0.055
Yousefi (2019)	anxiety	1.824	0.435	0.189	0.973	2.676	4.199	0.000
Yousefi 2(2019)	depression	3.933	0.699	0.489	2.562	5.303	5.625	0.000
Zamani (2020)	anxiety	0.379	0.368	0.136	-0.343	1.101	1.030	0.303
Zamani-2 (2020)	depression	1.416	0.304	0.093	0.819	2.013	4.652	0.000
Zargar	anxiety	2.271	0.468	0.219	1.353	3.189	4.849	0.000
		1.362	0.043	0.002	1.277	1.446	31.432	0.000

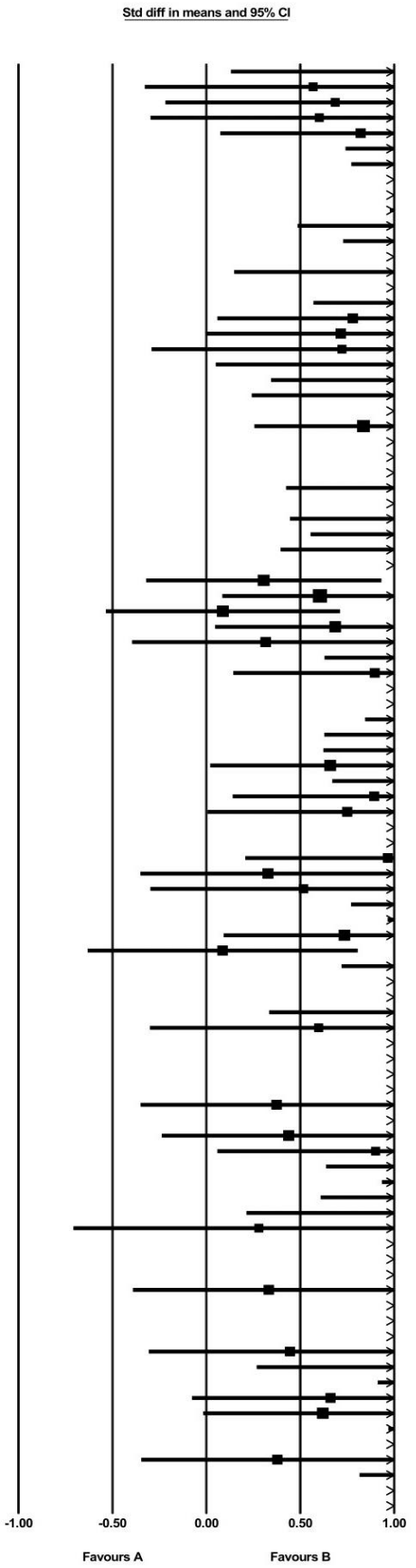

Figure 2. Forest Plot of the Effect Size of Cognitive Behavioral Therapy on Emotional Disorder

One of the main assumptions of meta-analysis is the absence of publication bias. In this study, before presenting the results, publication bias was assessed using two methods: funnel plots and the fail-safe N index. In the funnel plots (Figures 3 and 4), the horizontal axis represents effect sizes, and the vertical axis represents standard errors. Asymmetrical dispersion, especially in extreme effect sizes with large errors, indicates publication bias. Figure 4 appears more symmetrical than Figure 3, with effect sizes ranging from –0.5 to 2. According to the fail-safe N index, 3,737 non-significant effect sizes would be required to render the combined effect size non-significant. Finally, by removing 20 extreme effect sizes from the initial 93, a total of 73 effect sizes remained, and analyses were conducted on this refined dataset.

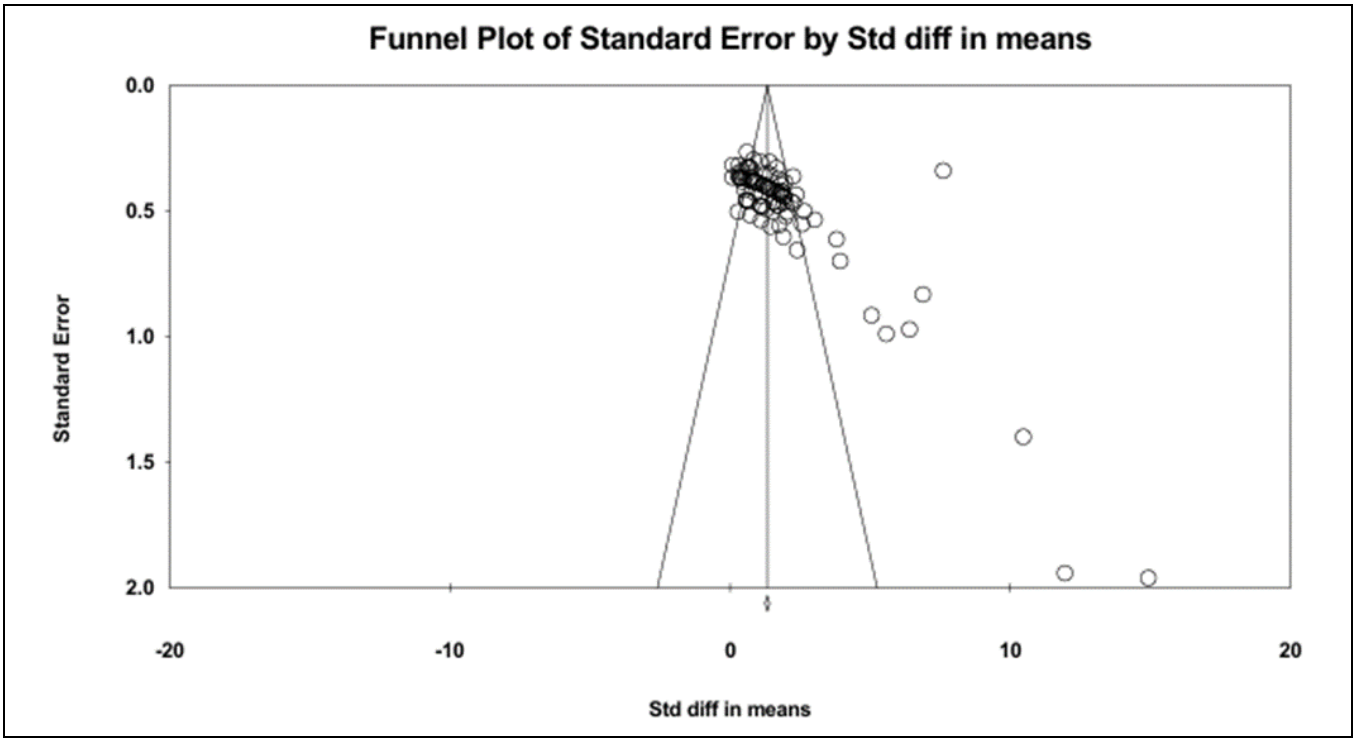

Figure 3. Funnel Plot of Publication Bias Before Sensitivity Analysis Showing Effect Sizes and Standard Errors

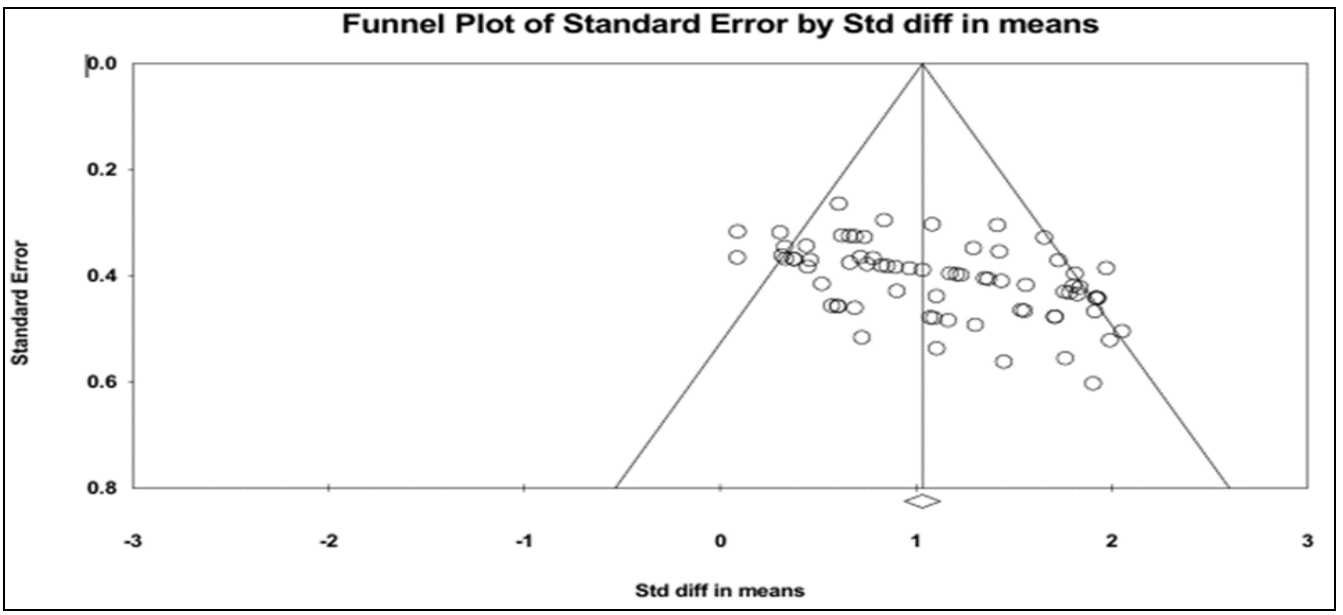

Figure 4. Funnel Plot of Publication Bias After Sensitivity Analysis Showing Effect Sizes and Standard Errors

Table 2 shows the effect size of CBT before and after sensitivity analysis. After removing outliers, the effect size slightly decreased but remained significant, indicating the effectiveness of this treatment method.

Table 2. Fixed and Random Effect Sizes for Cognitive Behavioral Therapy Effectiveness on Emotional Disorders

	Model	No of Effect Sizes	Summary Effect Size	S.E	Z	P
Before sensitivity analysis	Fixed effects	93	1.32	0.04	3.73	0.001
	Random effects	93	1.64	0.13	12.39	0.001
After sensitivity analysis	Fixed effects	73	1.03	0.04	22.38	0.001
	Random effects	73	1.07	0.06	16.32	0.001

Table 3 shows the combined effect sizes for anxiety (1.04), depression (1.09), OCD (1.19), PTSD (0.39), and stress (1.27), all statistically significant (P < 0.01) except for stress (P = 0.13). The highest effect size was for OCD and the lowest for PTSD. Heterogeneity was highest for anxiety (I^2 = 50.99).

Table 3. The Effectiveness of Cognitive Behavioral Therapy on Anxiety, Depression Obsessive-Compulsive Disorder, Post-Traumatic Stress Disorder, and Stress

Index	No. of Effect Sizes	Effect Size	SE	z	P	95% Confidence Interval		Heterogeneity	
						Lower	Upper	I^2	P
Anxiety	27	1.04	1.10	9.77	0.001	0.82	1.24	50.99	0.001
Depression	29	1.09	0.11	10.42	0.001	0.93	1.36	46.41	0.001
OCD	8	1.19	0.18	5.87	0.001	0.73	1.47	41.51	0.001
PTSD	3	0.39	0.26	1.49	0.001	0.123	0.9	19.98	0.001
Stress	6	1.27	0.26	5.12	0.1	0.85	1.90	41.83	0.13

OCD = obsessive-compulsive disorder, PTSD = post-traumatic stress disorder

The gender of participants in the primary studies was categorized into female, male, and mixed groups (Table 4). Effect sizes were 0.80 for females, 0.96 for males, and 1.12 for the mixed group (P = 0.001). Heterogeneity was 59.97 for females, 43.73 for males, and 41.46 for the mixed group, with the highest heterogeneity observed in females.

Table 4. Effect Sizes of Cognitive Behavioral Therapy on Emotional Disorders by Gender

Gender	No. of Effect Sizes	Effect Size	S.E	95% Confidence Interval		z	P	(I^2)
				lower	upper			
Female	13	0.80	0.17	0.53	1.22	4.98	0.001	59.97
Male	9	0.96	0.19	0.6	1.24	5.14	0.001	43.73
Female/Male	51	1.12	0.07	1.01	1.41	15.18	0.001	41.46

Heterogeneity among effect sizes was assessed using Cochran's Q (138.84, P < 0.001) and the I^2 index (48.86%), indicating moderate heterogeneity. Given Cochran's Q limitations, I^2 shows that nearly 49% of the variability reflects true heterogeneity. Following Higgins *et al.* (94), this level is moderate. Heterogeneity will be further examined via subgroups based on the dependent variable and gender. Thus, subsequent analyses use a fixed-effects model with heterogeneity estimates for each subgroup.

Meta-regression analysis was conducted to examine the role of participants' age as a continuous moderator variable. Figure 5 shows the regression line predicting Hedges' g effect size based on the mean age of participants. Both the intercept (0.76) and the regression coefficient (0.01) were statistically significant (P < 0.01). The regression equation (Y = 0.01X + 0.76) indicates a significant positive relationship between participants' age and Hedges' g effect size, meaning that for every one-unit increase in age, the effect size increases by 0.01 units.

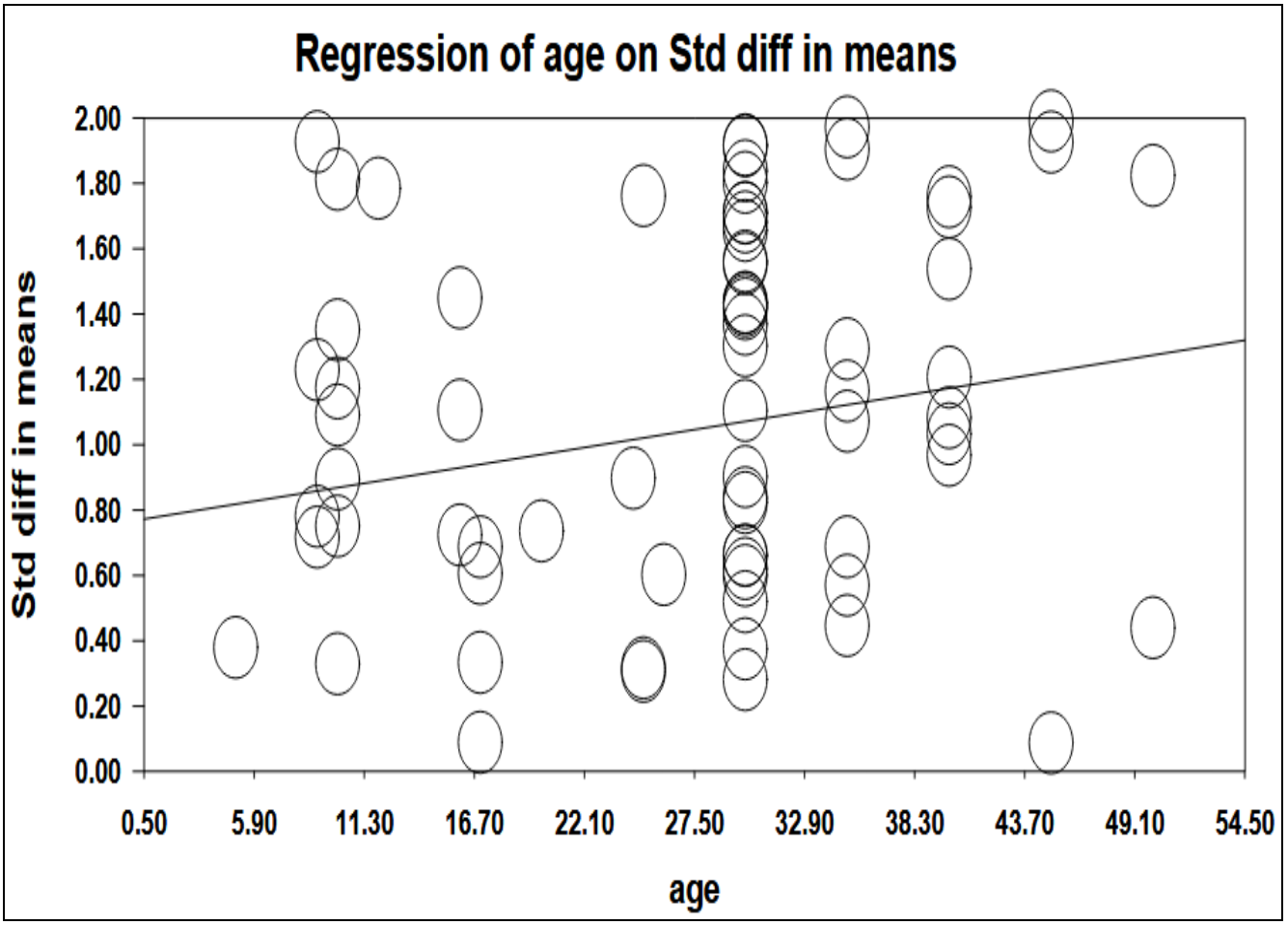

Figure 5. Meta-Regression Line Showing the Relationship between Participants' Age and Hedges' g Effect Size

Discussion

This meta-analysis examined the effectiveness of CBT on emotional disorders, yielding a large effect size of 1.07 based on a random-effects model (28). Results confirmed that CBT is highly effective in treating all emotional disorders, consistent with findings from Li *et al*. (16), Asadi *et al*. (95), Van Loenen *et al*. (17), Kiyanzad *et al*. (96), and Alipour *et al*. (97). Specifically, Asadi *et al*. (95) reported a significant positive effect of CBT on OCD. Additionally, Li *et al*. (16) demonstrated that CBT interventions effectively improved depression, anxiety, stress, BMI, and quality of life in patients with coronary heart disease.

According to the cognitive-behavioral model, distorted thinking is central to psychological disorders, and modifying such patterns improves mood and behavior, leading to lasting recovery by addressing dysfunctional core beliefs (98). Key cognitive factors in emotional disorders include heightened responsibility, overestimation of risk, thought suppression, and mental inhibition (95). CBT aims to identify and replace irrational, anxiety- and depression-inducing thoughts with rational alternatives. Through this process, individuals gain insight into their thought patterns and actively participate in restructuring them. Behavioral techniques, such as relaxation training, help reduce anxiety and stress by enabling individuals to recognize and manage physical symptoms. Moreover, maladaptive emotion regulation strategies are associated with heightened anxiety and depression. Conversely, adaptive strategies such as planning, acceptance, positive refocusing, and reappraisal enhance social functioning, promote cognitive restructuring, and contribute to improved mental health.

The results of this meta-analysis indicated that despite the large effect size of CBT in treating stress disorders (g = 1.21), the effect was not statistically significant. This can be attributed to several key factors: first, the limited number of studies (six studies) and low statistical power led to small sample sizes, and increased the likelihood of a Type II error (99). Second, the high heterogeneity among studies due to diverse populations (occupational stress, acute stress, chronic stress) and variations in treatment protocols and measurement tools contributed to greater variance and wider confidence intervals, thereby reducing the likelihood of obtaining statistically significant results (100). Third, the clinical complexity of stress disorders, such as chronic stress, requires

combined interventions (such as trauma-focused therapies and pharmacotherapy) and longer treatment durations, suggesting that short-term CBT alone may be insufficient to fully alleviate symptoms (15).

A detailed examination of multiple dependent variables showed that CBT has a large effect on depression, OCD, PTSD, and stress, with a large effect size. Originally designed to treat depression, anxiety, phobias, tension, anger, and communication problems, this therapy has consistently demonstrated success. In this approach, the therapist helps clients recognize disruptive behavior as learned and addresses the client's lack of skills to respond more adaptively (57). Previous research highlights that early treatment engagement is crucial for reducing symptoms of emotional disorders, and achieving the expected outcomes of CBT. Although the effect of CBT in gender subgroups was large according to Cohen's criteria (28), no significant gender differences were observed. Many recent studies suggest that psychological differences between men and women do not affect CBT effectiveness; instead, differences stem from cultural contexts, early experiences, and training (101).

Based on the findings of the meta-analysis, age was identified as a significant moderator in the effectiveness of CBT. Specifically, regression analysis revealed a significant association between age and therapeutic outcome (Slope = 0.01013, SE = 0.00418, P = 0.015). This suggests that age plays a crucial role in predicting how individuals respond to CBT, underscoring the importance of considering age-related factors in clinical practice and research design. Empirical evidence indicates that changes in cognitive flexibility, executive functioning, and psychological adaptability across the lifespan influence responsiveness to CBT (102). In particular, younger individuals typically demonstrate greater cognitive flexibility and openness to therapeutic interventions, resulting in more favorable treatment outcomes (98). In contrast, older adults may exhibit diminished executive functioning and cognitive rigidity associated with normal aging and chronic comorbid conditions, which may reduce the effectiveness of CBT (103). Meta-analytic studies emphasize that age acts as a significant predictor of treatment response and highlight the need for age-tailored CBT protocols to optimize outcomes (104). The current findings are consistent with this body of evidence, underscoring the vital role of age-related factors in the effectiveness of CBT.

Limitation

The main limitation of this study is the lack of access to all scientific databases for a fully comprehensive search and retrieval of all articles. In addition, due to limited access, this study only reviewed studies conducted in Iran and did not include studies from other countries.

Conclusion

The findings of the systematic review and meta-analysis indicated that CBT produced a large effect size in improving anxiety, depression, obsessive-compulsive disorder, post-traumatic stress disorder, and other stress-related disorders in intervention groups. CBT operates by challenging and replacing negative thoughts, thereby altering individuals' thought processes, and emphasizes the interconnectedness of thoughts, emotions, and behaviors. Over time, this process of questioning and restructuring negative thoughts can transform cognitive patterns. No significant differences were observed between Iranian men and women in their response to CBT; however, a significant association was found between participants' age and the effect size of CBT. Therefore, clinicians and researchers are encouraged to consider age-related factors in the design and evaluation of treatments to enhance the generalizability and applicability of CBT across different age groups.

One of the strengths of this study was its comprehensive scope, which enabled the inclusion of all studies related to emotional disorders to be reviewed. The findings may provide valuable implications for therapists regarding the application of CBT treatment in the field of emotional disorders.

Acknowledgment

The authors appreciate all researchers who participated in the preliminary studies.

Funding

The authors did not receive support from any organization for the submitted work.

Authors' Contributions:

L.M. and Z.G. contributed to the study design and performed the systematic review. A.F. conducted the data analyses. All authors read and approved the final manuscript.

Conflict of Interest

None.

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