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The efficacy of telephone-delivered cognitive behavioral therapy in people with chronic illnesses and mental diseases: A meta-analysis

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Abstract

COVID-19 pandemic led to an increase of remote treatments, such as telephone-delivery cognitive behavioral therapy (T-CBT). To our knowledge, no meta-analyses studied the effect of T-CBT in chronic and/or mental illnesses on multiple psychological outcomes. Therefore, our study aims to evaluating the efficacy of T-CBT compared to other interventions (treatment as usual, TAU, or face-to-face CBT). Each effect size (ES) was calculated in Hedges' g and pooled together to produce a mean ES for each outcome (depression, anxiety, mental and physical QoL, worry, coping, and sleep disturbances). The meta-analysis included 33 studies with a randomized controlled trial design. A large ES was found when comparing the efficacy of T-CBT against TAU on depression ($g = 0.84$, $p < 0.001$), whereas a moderate ES was found on anxiety ($g = 0.57$; $p < 0.001$), and a small effect on mental quality of life ($g = 0.33$, $p < 0.001$), sleep disturbances ($g = 0.37$, $p = 0.042$), coping ($g = 0.20$, $p = 0.016$) and worry ($g = 0.43$, $p = 0.001$). The meta-analysis comparing the efficacy of T-CBT and CBT on depression revealed a not significant pooled ES ($g = 0.06$, $p = 0.466$). The results

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provided evidence that T-CBT could be to be more effective than TAU conditions in multiple psychological outcomes, and as efficient as face-to-face CBT in treating depression.

KEYWORDS

cognitive behavioral therapy, efficacy, meta-analysis, telephone-delivery cognitive behavioral therapy

1 | INTRODUCTION

Mental illnesses account for 38% of all diseases in rich countries, followed by heart disease, stroke, cancer, long diseases, diabetes, and other physical illnesses, accounting for 22% and 40%, respectively (Layard & Clark, 2014). Mental disorders can lead to suicide, the major cause of death for these diseases. Furthermore, the burden of suffering for patients and their caregivers and the years of life lost due to disability or premature death are significant. In Europe, the major depressive disorders affect 6% of the total burden of suffering and people with disability. Mental disorders cause a significant societal and educational economic burden. The estimated annual economic impact of mental disorders in Europe is 3%–4% of gross domestic production. In Europe, missed days from work due to major depressive disorders are significantly higher than those missed due to other diseases (e.g., diabetes or heart disease) (Italian National Institute [ISS, 2020a, 2020b, 2021]; Picconi et al., 2019; Sergi et al., 2021).

Consequently, the National Institute for Health and Care Excellence (NICE) recommends evidence-based psychotherapies, with both low and high-intensity interventions for depression, generalized anxiety disorders (GAD), panic disorders, irritable bowel syndrome (IBS), body dysmorphic disorder, chronic fatigue syndrome, specific phobias, obsessive compulsive disorders (OCD) and posttraumatic stress disorder (PTSD). Psychotherapy efficacy means achieving clinical goals, through careful assessment and treatment. In particular, the term "psychotherapy" should be distinguished from the "evidence-based psychological treatments" (American Psychological Association, 2013). The accuracy of the treatment is determined by two elements: an improvement in the pathology after the treatment and define which aspect of the treatment leads to this improvement. The definition of these two elements comes through the randomized controlled trials method (RCTs). Between the 1960s and 1970s, psychotherapy showed numerous scientific advances, including the cognitive behavioral therapy (CBT). CBT is characterized by cognitive and behavioral techniques that change maladaptive beliefs (Carpenter et al., 2018). General findings underline as about 50% of people treated with CBT for depression, anxiety, or OCD disorders show an improvement of symptoms (Layard & Clark, 2014). The effects of these treatments are quite constant and show continuing improvement after therapy end. Variations are due to patients' characteristics (e.g., social support or diagnosis complexity). Indeed, those receiving the CBT plus standard treatment (ST) compared to ST alone at 6, 12, 18, and 24 months show an improvement in the symptoms (Barlow et al., 2013). Several meta-analyses show the evidence of CBT for major depression (MMD) and anxiety disorders. These studies underline a superior effect of the CBT over pharmacotherapy in GAD (ES = 0.18; 95% confidence interval [CI] = −0.76 to 1.12) (Cuijpers et al., 2014). In addition, the comparison of the CBT versus care-as-usual in MMD, panic disorder (PAD), social anxiety disorder (SAD) indicates a significant effect size of the CBT (ES = 0.60; 95% CI = 0.45 to 0.75 for MMD; ES = 0.27; 95% CI = −0.12 to 0.65 for PAD; ES = 0.44; 95% CI = 0.12 to 0.77 for SAD) (Cuijpers, 2015). Furthermore, the CBT has greater effect on SAD compared to psychodynamic psychotherapy (ES = −0.62; 95% CI = −0.93 to −0.31) (Mayo-Wilson et al., 2014). Several studies show as the CBT has greater effect on OCD

compared to another drug or psychological treatment (ES = 1.33; 95% CI = 0.91 to 1.76) (Öst et al., 2015). These results are confirmed on panic disorder with or without Agoraphobia in adults, underling a greater effect of the CBT compared to behavioral therapy (BT) (ES = 2.09; 95% CI = 1.10 to 3.97) (Pompoli et al., 2016). Regarding PTSD, CBT is associated to a reduction of depression and anxiety symptoms compared to usual care group or TAU (ES = −1.15; 95% CI = −1.98 to −0.32 and ES = −0.66; 95% CI = −1.06 to −0.27, respectively) (Bisson et al., 2013). As regards mild cognitive impairment, CBT is associated to an improvement of cognitive abilities (ES = 0.398; 95% CI = 0.164 to 0.631) (Sherman et al., 2017). These data show CBT efficacy compared to control conditions, placebo, TAU, and other therapies (such as psychodynamic and pharmacotherapies). For this reason, CBT can be considered the "gold-standard," or the best standard in the psychological field at the moment (David et al., 2018).

The current coronavirus disease (COVID-19) pandemic has caused global changes in the provision of psychotherapy; since direct contact with others had to be avoided, when possible, remote psychotherapy was preferred when available. COVID-19 increased the frequency of alternative remote treatments, such as telephone-delivery cognitive behavioral therapy (T-CBT) (Humer et al., 2020; Waller et al., 2020).

These alternative ways of providing CBT in extreme situations—such as the current COVID-19 pandemic—may be extremely helpful especially for those individuals who are at higher risk of severe or fatal disease course (Djaharuddin et al., 2021; Gallo Marin et al., 2021) and/or who are not able to reach the therapist's office due to physical problems, such as people living with a chronic disease. Chronic diseases are long-lasting, they may be slow in progression, in most cases they cannot be cured but they may be treatable, and they need ongoing medical assistance; moreover, they may have a considerable impact on basic and instrumental activities of daily living (National Center for Chronic Disease Prevention and Health Promotion, 2022). Chronic illnesses considered as such include diabetes, AIDS, fibromyalgia, cancer, neurological diseases such as multiple sclerosis and Parkinson's disease, and so on (Bernell & Howard, 2016). Treatment of chronic illnesses should not only focus on management of physical symptoms, but also psychological ones: in fact, people with chronic diseases frequently experience poor quality of life (Ge et al., 2019) and they may be more prone to emotional dysregulation, which, in turn, depletes the energies necessary for personal management of chronic disease and may lead to poor health outcomes (Wierenga et al., 2017). Furthermore, prevalence of depression and anxiety seems to be higher in people with chronic illnesses when compared to those of healthy peers (e.g., see Chaponda et al., 2018; Farooqi et al., 2022; Grigsby et al., 2002; Kamalaraj et al., 2019; Krebber et al., 2014; Peres et al., 2022; Wang et al., 2019).

Several studies addressed the efficacy of T-CBT on people with mental diseases with or without chronic physical diseases, revealing that T-CBT was associated to a reduction of several psychological symptoms and an improvement of well-being. For example, RTCs demonstrated that T-CBT was more effective than control conditions to promote smoking cessation (Wu et al., 2017), to reduce depression and anxiety symptoms (Durland, 2020; Lawn et al., 2019), to reduce alcohol, food, or drugs addictions in patients with physical problems (Cassin et al., 2020; Meng et al., 2021). However, the comparison on the efficacy of T-CBT versus other interventions (i.e., treatment as usual [TAU]) yielded contrasting results: some studies found that T-CBT was more effective than TAU condition on ameliorating the psychological status of people with chronic diseases (Dobkin et al., 2020; Piette et al., 2011; Sockalingam et al., 2022; Yeung et al., 2022), whereas other studies did not (Allen et al., 2016; Ang et al., 2010; Doyle et al., 2017; McBeth et al., 2012). The same finding was found when examining studies assessing the efficacy of T-CBT on people with psychological disorders without comorbidities: some studies found that T-CBT reduced psychological symptoms more efficiently than TAU (Brenes et al., 2012; Olthuis et al., 2014; Vázquez et al., 2020), others did not find any difference between the two treatments (Arndt et al., 2013; Gallegos et al., 2015; Graser et al., 2020; Ngai et al., 2017).

In scientific literature only one meta-analysis that explored the efficacy of T-CBT compared to other therapies, but it focused only on the possible reduction of physical symptoms (Muller & Yardley, 2011); this meta-analysis, conducted on eight studies, showed that T-CBT improved physical health in chronic illnesses (SE = 0.225; 95% CI = 0.105 to 0.344). To our knowledge, no meta-analytic study focused on the effect of T-CBT in chronic and/or mental illnesses on multiple psychological outcomes; moreover, no meta-analysis tried to compare the efficacy of

T-CBT and the current gold-standard for psychotherapy (face to face CBT) on psychological outcomes in people with mental diseases and/or chronic illnesses. Therefore, considering the abovementioned inconsistencies and taking account of the gap in literature, our study aims to: (1) evaluating whether T-CBT is more effective than other interventions (i.e., treatment as usual, TAU) in improving the following outcomes: anxiety, coping strategies, depression, mental and physical quality of life (QoL), sleep disturbances, and worry; (2) assess whether T-CBT is as effective as traditional, face to face CBT, in treating the abovementioned outcomes.

2 | MATERIALS AND METHODS

2.1 | Literature search and inclusion criteria

On June 29, 2022 a literature search was performed on three electronic databases (Scopus, Pubmed, and PsycINFO) by employing the following query: (telephone-based OR phone-based OR mobile phone-based OR telephone-supported OR phone-supported OR telephone-delivered OR phone-delivered OR mobile phone-delivered) AND (CBT OR cognitive behavioral therapy OR cognitive behavioral therapy). The meta-analytic study was performed by following the preferred reporting items for systematic review and meta-analyses (PRISMA) statement (Moher et al., 2015). The study protocol was registered to PROSPERO (registration number CRD42021259516). Inclusion criteria for primary studies were: (1) study written in English; (2) RCT with adults living with mental disorders and/or chronic pathologies. Chronic disease was defined as a long-lasting medical condition and requires ongoing medical assistance/treatment and/or limit activities of daily living (National Center for Chronic Disease Prevention and Health Promotion, 2022), such as diabetes, AIDS, fibromyalgia, cancer, and so on. As regards mental illnesses, only pathologies included in the fifth edition of Diagnostic and Statistical Manual of Mental Disorders (American Psychiatric Association, 2013) were considered; (3) presence of a sample undergoing T-CBT; (4) presence of at least one of the following groups of control (CG): TAU group (treatment as usual/waiting list) or traditional face to face CBT (CBT group); (5) presence of data necessary for computation of effect size (ES).

2.2 | Data collection and coding

The following psychological variables were selected as outcomes: (1) anxiety; (2) coping; (3) depression; (4) mental and physical QoL; (5) sleep disturbances; (6) worry. Two authors (Manuela Altieri and Maria R. Sergi) independently performed the selection process; in case of uncertainty, other authors with expertise in psychological assessment were consulted to reach an agreement. If more than one measure was employed for the same outcome in a primary study, the most representative measure (i.e., the one most employed among primary studies) was included in the analyses. If a primary study reported data about multiple follow-ups, the longer time point assessment was included in the meta-analytic study. For the purposes of this study, ethical committee approval was not required since primary studies already obtained ethics approval.

2.3 | Data extraction and quality assessment

The following data were extracted from primary studies: (1) publication year; (2) socio-demographic characteristics of the sample; (3) type of treatment (including number of sessions and length of follow-up evaluation) and control condition; (4) outcome measures; (5) data necessary for computation of ES (i.e., mean and standard deviations of pre and postscores of psychological tests in both T-CBT and CGs groups. When mean and standard deviations were not available, mean and p-value of prepost treatment difference in both T-CBT and CGs groups were added in the

meta-analysis); (6) illnesses of samples. To assess the quality and risk of bias of each primary study, the Jadad Scale was employed (Jadad et al., 1996); a score ≥ 3 indicated a high-quality study.

2.4 | Statistical analyses

Analyses were performed by means of ProMeta3 software, by employing a random effect statistical model. Each ES was calculated in Hedges' g, and all ES were pooled together to produce a mean ES for each outcome. Separate meta-analyses were performed to produce both single ES for each outcome, and an overall ES combining all outcomes. A p-value < 0.05 was considered statistically significant. Positive values of Hedges' g were indicative of a higher efficacy of T-CBT. As regards the interpretation of ES, guidelines provided by Cohen were considered: values ~0.20 were indicative of small ES, whereas ~50 and above 0.80 indicated moderate and large ES, respectively (Cohen, 2013). To evaluate interstudy heterogeneity Cochran's Q and I^2 statistics were calculated; I^2 values under 50% indicated low heterogeneity, whereas values between 50% and 75%, and values above 75% were indicative of moderate and high interstudy heterogeneity, respectively (Higgins, 2003). If heterogeneity statistics revealed a high interstudy heterogeneity on a specific outcome, a sensitivity analysis served to verify if the exclusion of one study at the time could decrease the heterogeneity levels. Moreover, as quality control measure, the publication bias analysis was performed.

3 | RESULTS

Literature search provided 445 primary studies, that became 321 after removal of duplicates. After reading titles and abstracts, 111 studies were removed because they did not meet inclusion criteria; therefore, 210 studies were fully evaluated. The complete PRISMA flow chart and full reasons for exclusion are reported in Figure 1. Thirty-three studies were included in the meta-analytic study (see Table 1): 29 studies were included in the meta-analysis comparing the efficacy of T-CBT and TAU on psychological outcomes (Adler et al., 2015; Alcántara et al., 2016; Allen et al., 2016; Ang et al., 2010; Arndt et al., 2013; Brenes et al., 2012; Cassin et al., 2016; Dobkin et al., 2020; Doyle et al., 2017; Dwight-Johnson et al., 2011; Gallegos et al., 2015; Graser et al., 2020; Laurel Franklin et al., 2018; Ludman et al., 2007; Macfarlane et al., 2016; McBeth et al., 2012; Mohr et al., 2005, 2011; Napolitano et al., 2002; Ngai et al., 2015, 2017; Olthuis et al., 2014, 2015; Piette et al., 2011; Sockalingam et al., 2022; Stecker et al., 2014; Vander Weg et al., 2016; Vázquez et al., 2020; Yeung et al., 2022), whereas five studies were added in the meta-analysis comparing the efficacy of T-CBT and CBT (Himelhoch et al., 2013; Lovell et al., 2006; McAndrew et al., 2018; Nicholas et al., 2021; Watson et al., 2017). One study evaluated both the efficacy of T-CBT and TAU, and T-CBT and CBT on psychological outcomes, therefore it was included in both meta-analyses (McAndrew et al., 2018).

3.1 | Study quality assessment

All included studies were RCTs (see Table 2). A correct randomization was guaranteed for all studies examined. Regards the blinding procedure taking account the nature of interventions all studies didn't describe the masking to experimental conditions of participants and therapists. In particular, five studies reported a masked procedure only for the trial principal investigators and statisticians (Doyle et al., 2017; McBeth et al., 2012; Nicholas et al., 2021; Vázquez et al., 2020; Yeung et al., 2022). Only two studies did not report a description of drop-outs (Alcántara et al., 2016; Brenes et al., 2012).
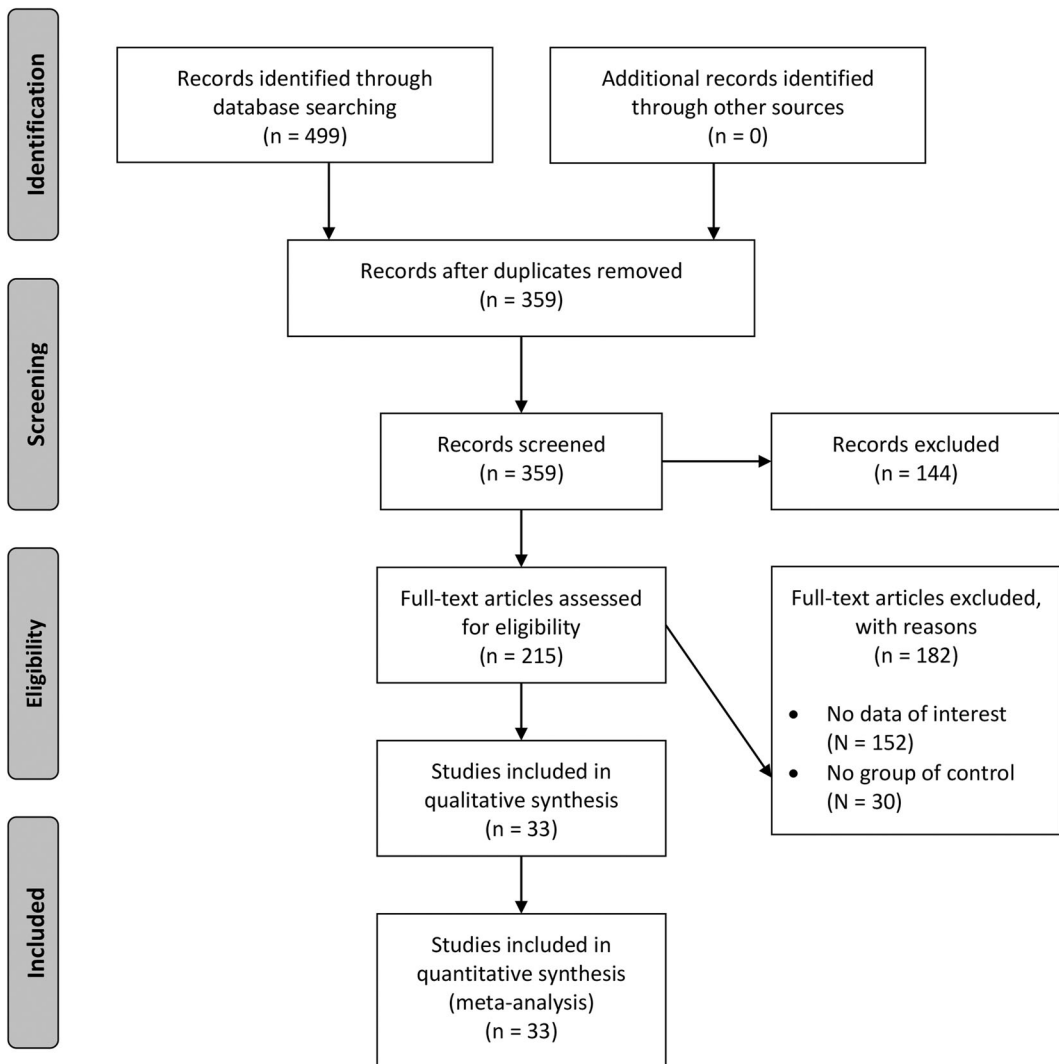
FIGURE 1 Study selection process.

3.2 | Meta-analysis comparing the efficacy of T-CBT and TAU on psychological outcomes

Anxiety: The nine studies comparing the efficacy of T-CBT and TAU on levels of anxiety revealed a significant and moderate pooled ES ($N = 631$; $k = 9$; $g = 0.57$, 95% CI [0.37 to 0.77]; $p < 0.001$). Neither the interstudy heterogeneity ($Q = 12.22$, $df = 8$, $p = 0.142$, $I^2 = 34.52$) nor the publication bias ($t = 1.16$, $p = 0.285$) were significant (Figure 2a).

Coping: Four studies evaluated the effect of T-CBT and TAU on coping strategies; a small but significant pooled ES was found ($N = 594$; $k = 4$; $g = 0.20$, 95% CI [0.04 to 0.36]; $p = 0.016$), with nonsignificant interstudy heterogeneity ($Q = 1.61$, $df = 3$, $p = 0.658$, $I^2 = 0$) and a nonsignificant publication bias ($t = 1.61$, $p = 0.122$) (Figure 2b).

Mental QoL: a significant and low pooled ES was detected ($N = 1013$; $k = 8$; $g = 0.33$, 95% CI [0.18 to 0.48]; $p < 0.001$). Both interstudy heterogeneity ($Q = 7.66$, $df = 7$, $p = 0.363$, $I^2 = 8.62$) and publication bias ($t = 2.32$, $p = 0.059$) were not significant (Figure 3a).

TABLE 1 Studies included in the meta-analysis.

Study	N	Mean age (SD)	M%	Telephone treatment	Control condition	Sessions (N)	Outcome measures	Lenght of follow-up	Exclusion criteria	Illness
Adler et al. (2015)	WFI = (85 TAU = 82	WFI = 54.3 (5.2) TAU = 55 (6.7)	WFI = 28.2% TAU = 24.4%	WFI	TAU	8	PHQ-9	4 months	Psychosis, bipolar disorder, current alcohol abuse, non-English speaking, and severe physical limitations	Dysthymia
Alcántara et al. (2016)	Telephone ECLA = 87 TAU = 86	No means, number of subjects in age class	Telephone ECLA: 14.9% TAU: 17.4%	ECLA	TAU	6-8	PSWQ	N.A.	History of psychosis, <3 months of specialty mental health treatment, current suicidality	Depression
Allen et al. (2016)	T-CBT = 151 TAU = 149	T-CBT = 60.4 (9.4) TAU = 61.7 (9)	T-CBT = 86.8% TAU = 94.6%	T-CBT	TAU	18	PHQ-8	12 months	Other rheumatologic conditions: recent hip or knee surgery or injury; recent hospitalization for cardiovascular or cerebrovascular events; severe neurologic or psychiatric conditions and memory loss; terminal illness; nursing home residence; severe hearing or speech impairment; blindness; current pregnancy	Veterans with osteo-arthritis

(Continues)

TABLE 1 (Continued)

Study	N	Mean age (SD)	M%	Telephone treatment	Control condition	Sessions (N)	Outcome measures	Lenght of follow-up	Exclusion criteria	Illness
Ang et al. (2010)	T-CBT = 15 TAU = 17	T-CBT = 50.5 (9.5) TAU = 47 (12.4)	0%	T-CBT	TAU	6	PHQ-8	6–12 weeks	Peripheral neuropathy, diabetes mellitus, demyelinating disorders, and inflammatory rheumatic diseases.	Fibromyalgia
Arndt et al. (2013)	T-CBT = 15 Information pamphlet control = 15	T-CBT = 38.1 (14.6) Information pamphlet control = 40 (14.6)	T-CBT = 0% Information pamphlet control = 20%	CBT-T	Information pamphlet control	4–8	ISI SF-12 Quick Inventory of Depressive Symptomatology STAI-trait subscale	12 weeks	Diagnosis or high clinical suspicion of a sleep disorder other than insomnia; poorly controlled Axis I psychiatric disorder; uncontrolled medical disorder or pain syndrome that interfered with sleep, caused daytime sleepiness, or was likely to be causally related to the insomnia; current nonphamacologic insomnia treatment or previous failed trial of CBT for insomnia; routine overnight shift work	Chronic insomnia

TABLE 1 (Continued)

Study	N	Mean age (SD)	M%	Telephone treatment	Control condition	Sessions (N)	Outcome measures	Lenght of follow-up	Exclusion criteria	Illness
Brenes et al. (2012)	T-CBT = 30 Information only = 30	T-CBT = 68.8 (7.3) Information only = 69.5 (6.9)	T-CBT = 16.7% Information only = 16.7%	T-CBT	Information only	8 + 4 booster sessions	BDI ISI PSWQ STAI SF-36	6 months	Current psychotherapy; current alcohol or substance abuse; dementia or global cognitive impairment; psychotic symptoms; active suicidal ideation; any change in psychotropic medications within the previous 3 months.	Anxiety
Cassin et al. (2016)	T-CBT = 23 TAU = 24	Total sample = 45.5 (8.9)	Total sample = 17%	T-CBT	TAU	6	PHQ-9 GAD-7 SF-36	7 weeks	Ineligibility for bariatric surgery, lack of computer access, language barrieres, poorly controlled psychiatric illness, severe medical illness	Preoperative bariatric surgery patients

(Continues)

TABLE 1 (Continued)

Study	N	Mean age (SD)	M%	Telephone treatment	Control condition	Sessions (N)	Outcome measures	Lenght of follow-up	Exclusion criteria	Illness
Dobkin et al. (2020)	T-CBT + TAU = 37 TAU = 35	T-CBT + TAU = 65.6 (9.8) TAU = 64.8 (9.6)	T-CBT + TAU = 27.8% TAU = 23.6%	T-CBT + TAU	TAU	10	HAM-A HAM-D	1–6 months	Possible dementia or marked cognitive impairment; active suicidal plans; unstable serious medical conditions (cancer); or primary psychotic, bipolar, or substance abuse disorder per DSM-5 criteria.	Parkinson's disease with depression
Doyle et al. (2017)	T-CBT: 54 B-T: 56	T-CBT: 68.5 (9.4) B-T: 67 (9.1)	CBT-T: 35.2% B-T: 33%	T-CBT	B-T	8	PHQ-9 BAI GSES	8 weeks	Age < 45 years, not living in the community, hearing loss, non-English speaker, unstable dose of psychotropic medication in the last 3 months	Chronic obstructive pulmonary disease with mood disorders
Dwight-Johnson et al. (2011)	T-CBT = 50 TAU = 51	T-CBT = 41.2 (9.6) TAU = 38.5 (1.3)	T-CBT = 22% TAU = 22%	T-CBT	TAU	8	PHQ-9	24 weeks	Not self-identified as Latino, non-English, or Spanish speakers; absence of major depressive disorder; bipolar disorder, cognitive impairment, psychosis, substance abuse, suicidal ideation	Latino patients living in rural areas with major depression

TABLE 1 (Continued)

Study	N	Mean age (SD)	M%	Telephone treatment	Control condition	Sessions (N)	Outcome measures	Lenght of follow-up	Exclusion criteria	Illness
Gallegos et al. (2016)	274 T-CBT = 123 No treatment = 151	N.A.	N.A.	T-CBT	No treatment	4	PHQ-9	1–3–6 months	Current or past PTSD treatment	Veterans with PTSD, depression and suicidal ideation
Graser et al. (2020)	Telephone-based continuing care = 115 No treatment: 64	High-frequency telephone-based continuing care: 53 (11.4) Low-frequency telephone-based continuing care: 49 (10.2) No treatment: 49.5 (8.4)	High-frequency telephone-based continuing care: 74.5% Low-frequency telephone-based continuing care: 67.2% No treatment: 67.2%	Telephone-based continuing care	No treatment	9 (high-frequency quency tele-phone-based continuing care) 3 (low-frequency quency tele-phone-based continuing care)	BDI-II	24 weeks	Age < 18 years; no diagnosis of alcohol use disorder; no regular treatment discharge; no long-term abstinence drinking goal for the next 6 months	Alcohol use disorder
Himelhoch et al. (2013)	T-CBT: 16 CBT: 18	T-CBT: 42.47 (7.95) Face-to-face CBT: 46.78 (8.87)	T-CBT: 29.4% CBT: 27.8%	T-CBT	CBT	11	HAM-D	14 weeks	Receiving concurrent psychotherapy, life expectancy <6 months as determined by their HIV clinician, having HIV-related dementia as determined by the HIV dementia scale	HIV/AIDS patients with major depression

(Continues)

TABLE 1 (Continued)

Study	N	Mean age (SD)	M%	Telephone treatment	Control condition	Sessions (N)	Outcome measures	Lenght of follow-up	Exclusion criteria	Illness
Laurel Franklin et al. (2018)	T-CBT = 11 CBT = 7	Total sample: 53.8 (12)	100%	T-CBT	CBT	N.A.	PSQI	12 weeks	Uncontrolled primary sleep disorders; active psychosis and substance dependence, enrolled in other active psychotherapies; no consistent regimen of medications (including those prescribed for sleep)	Rural veterans with insomnia and with PTSD or sub-threshold PTSD
Lovell et al. (2006)	T-CBT = 36 CBT = 36	T-CBT = 33.4 (9) CBT = 30.4 (10)	T-CBT = 44% CBT = 25%	T-CBT	CBT	10	BDI	1–3–6 months	Obsessional slowness variant; organic brain disease, abuse of substance; patients who had initiated or changed dose of antidepressants or anxiolytics; intent and plan of suicidality	OCD

TABLE 1 (Continued)

Study	N	Mean age (SD)	M%	Telephone treatment	Control condition	Sessions (N)	Outcome measures	Lenght of follow-up	Exclusion criteria	Illness
Ludman et al. (2007)	T-CBT = 198 TAU = 195	T-CBT = 44.7 (15.7) TAU = 44 (16)	T-CBT = 22% TAU = 44 26%	T-CBT	TAU	8 + 4 booster sessions	HSCL	6 weeks, 3-6-9-1-2-18 months	Remission of depression; regular use of antidepressants in the prior 90 days; cognitive or language or hearing problems to preclude participation; patients already receiving psychotherapy	Depression
McAndrew et al. (2018)	CBT-T: 42 CBT: 43 TAU: 43	CBT-T: 57.6 (6.6) CBT: 55.4 (8.2) TAU: 56.8 (7.3)	Total sample = 94.5%	T-CBT	TAU CBT	10	PHQ-15	12 months	Serious comorbid psychiatric diagnosis; serious comorbid medical disorder	Veterans with chronic multisymptom illness
McBeth et al. (2012)	T-CBT = 112 TAU = 109	T-CBT = 56.5 TAU = 56.3	T-CBT = 28.6% TAU = 30.3%	T-CBT	TAU	7 weekly sessions + 2 booster sessions	SF-36 Sleep scale; VPMI	6-9 months	Severe psychiatric disorder; contraindications for exercise, a condition not indicated (e.g., metastatic cancer)	Chronic widespread pain
Mohr et al. (2005)	T-CBT = 62 T-SEFT = 65	T-CBT = 48.6 (9.6) T-SEFT = 47.3 (10.1)	T-CBT = 24.2% T-SEFT = 21.5%	T-CBT	T-SEFT	16	BDI-II	3-6-9-12 months	Current diagnosis of dysthymia and psychiatric disorders based on DSM-IV	Major depressive disorder

(Continues)

TABLE 1 (Continued)

Study	N	Mean age (SD)	M%	Telephone treatment	Control condition	Sessions (N)	Outcome measures	Lenght of follow-up	Exclusion criteria	Illness
Mohr et al. (2011)	T-CBT = 41 TAU = 44	Total sample = 55.9 (10.6)	Total sample = 90.6%	T-CBT	TAU	16	PHQ-9	6 months	Hearing, voice or visual impairments; psychiatric disorders; abusing alcohol or other substances; receiving psychotherapy during the 24 weeks treatment phase of the study; had initiated or changed dose of antidepressants; intent and plan of suicidality.	Veterans with major depressive disorder
Napolitano et al. (2002)	T-CBT = 36 TAU = 35	T-CBT 44.22 (12.7) TAU: 46.63 (12.42)	T-CBT: 30.6% TAU: 30.6%	T-CBT	TAU	8	SF-36 GHQ	8 weeks	N.A.	Patients awaiting lung transplantation
Ngai et al. (2015)	T-CBT = 197 TAU = 200	T-CBT: 31.1 (3.8) TAU: 30.4 (4.4)	0%	T-CBT	TAU	5	EPDS	24 weeks	Single women; complications after delivery; regular psychiatric follow-up, use of antidepressant or antipsychotic drugs	Women with postnatal depression

TABLE 1 (Continued)

Study	N	Mean age (SD)	M%	Telephone treatment	Control condition	Sessions (N)	Outcome measures	Lenght of follow-up	Exclusion criteria	Illness
Ngai et al. (2017)	T-CBT = 197 TAU = 200	T-CBT: 31.1 (3.8) SC: 30.4 (4.4)	0%	T-CBT	TAU	5	SF-12	24 weeks	Single women; complications after delivery; regular psychiatric follow-up, use of antidepressant or antipsychotic drugs	Mothers at risk of postnatal depression
Nicholas et al. (2021)	T-CBT = 153 Internet delivery CBT = 151	Total sample = 37.6 (14)	Total sample = 26.6%	T-CBT	Internet delivery CBT	5	PHQ-9	5 weeks	Visual or hearing problems; severe psychiatric disorders; use of antidepressants; current psychotherapy; severe suicidality	Depression and anxiety
Olthuis et al. (2014)	T-CBT: 40 Waiting List: 40	T-CBT: 36.2 (12.2) Waiting List: 36.5 (10.4)	T-CBT: 15% Waiting List: 27.5%	T-CBT	Waiting list	8	ASI-3 PSWQ DASS-dep	12 weeks	No access to telephone, low Anxiety sensibility, contraindications to physical activity, current psychotherapy, no pharmacological intervention months before treatment; psychosis; current suicidal ideation	High anxiety sensitivity

(Continues)

TABLE 1 (Continued)

Study	N	Mean age (SD)	M%	Telephone treatment	Control condition	Sessions (N)	Outcome measures	Lenght of follow-up	Exclusion criteria	Illness
Olthuis et al. (2015)	T-CBT = 40 No treatment = 40	Total sample = 36.3 (11.3)	Total sample = 21%	T-CBT	No treatment	8	ASI-3	8–12 weeks	Contraindications to exercise; current psychosis; use of psychiatric drugs in the last 3 months; current psychotherapy; severe suicidality	Anxiety
Piette et al. (2011)	T-CBT = 145 TAU = 146	T-CBT = 55.1 (9.4) TAU = 56 (10.9)	T-CBT = 50% TAU = 49%	T-CBT	TAU	12 + 9 booster sessions	SF-12 BDI Brief Cope Test	12 months	PHQ-9 score <11; change of antidepressants in the prior 30 days; no anti-hyperglycemic medication; psychotic disorders; serious illness (e.g., end-stage renal disease).	Diabetes with depression
Sockalingam et al. (2022)	T-CBT: 40 TAU: 41	Total sample: 47.68 (9.36)	Total sample: 19.8%	T-CBT	TAU	6 + 1 booster session	GAD-7 PHQ-9	3 months	Illness that would impede a patient's ability to engage in CBT-T sessions (e.g., psychosis) or active suicidal ideation	Mental Health Distress and Disordered Eating Among Bariatric Surgery Patients
Stecker et al. (2014)	T-CBT: 123 TAU: 151	CBT-T: 28.3 (5.3) US: 30.2 (6.9)	CBT-T: 57% US: 43%	T-CBT	TAU	1	PHQ-9	24 weeks	PTSD treatment	Veterans with PTSD

TABLE 1 (Continued)

Study	N	Mean age (SD)	M%	Telephone treatment	Control condition	Sessions (N)	Outcome measures	Lenght of follow-up	Exclusion criteria	Illness
Vázquez et al. (2020)	T-CT = 69 TAU = 80	T-CT = 54.8 (10.7) TAU = 52.9 (10.7)	T-CT: 10.1% TAU: 12.5%	T-CT	TAU	5	CES-D	Immediately postintervention	Psychiatric or psychological treatment in the previous two months; psychological or medical condition; significant disease that made it impossible to conduct the study; participation in another study; an anticipated change of address; a serious or terminal prognosis; severe suicidality	Depression
Vander Weg et al. (2016)	T-CBT = 31 Quitline referral = 32	T-CBT = 55.1 (11.5) Quitline referral = 58.5 (8.8)	T-CBT = 84.4% Quitline referral = 90.3%	T-CBT	Quitline referral	6	PHQ-9	12 weeks and 6 months	No telephone access; unable to provide informed consent; not have stable residence; significant cognitive problems; elevated depressive symptom and suicidal ideation.	Veterans with tobacco dependence

(Continues)

TABLE 1 (Continued)

Study	N	Mean age (SD)	M%	Telephone treatment	Control condition	Sessions (N)	Outcome measures	Lenght of follow-up	Exclusion criteria	Illness
Watson et al. (2017)	T-CBT: 60 CBT: 58	T-CBT: 48.5 (13.3) CBT: 52.4 (13.1)	T-CBT: 27% CBT: 29.2%	T-CBT	CBT	8	HADS-D HAS-A CCQ	8 weeks	Melanoma skin cancer diagnosis; disease prognosis <3 months; communication or cognitive problems; no current psychotherapy	Cancer
Yeung et al. (2022)	T-CBT = 162 Education-only = 163	T-CBT: 70.0 (7.1) Education only: 70.3 (6.5)	T-CBT = 24.1% Education only = 26.4%	T-CBT	Education-only	6	ISI	12 months	N.A.	Osteoarthritis-related insomnia

Abbreviations: ASI-3, anxiety sensitivity index-3; BDI, beck depression inventory; BDI-II, beck depression inventory, second edition; B-T, telephone befriending; CBT, cognitive behavioral therapy; CCQ, cancer coping questionnaire; CES-D, center for epidemiological studies depression scale; DASS-dep, depression anxiety stress scales-21 depression subscale; ECLA, engagement and counseling for latinos telephone CBT based intervention; EPDS, Edinburgh postnatal depression scale; GAD-7, generalized anxiety disorder scale; GHQ, general health questionnaire; GSES, general self-efficacy scale; HAM-A, Hamilton anxiety rating scale; HAM-D, Hamilton depression rating scale; HSCL, Hopkins symptom checklist-depression scale; ISI, Western insomnia severity index; M%, percentage of men in the sample; N, number of participants; N.A., not available; PHQ-15, patient health questionnaire depression screener; PHQ-8, patient health questionnaire-8 items; PHQ-9, patient health questionnaire-9 items; PSQI, Pittsburgh sleep quality index; PSWQ, Penn state worry questionnaire; PTSD, posttraumatic stress disorder; SF-12, medical outcomes study short form 12-item health survey; SF-36, self-reported health beliefs short form 36; STAI, state-trait anxiety inventory; TAU, treatment as usual; T-CBT, telephone-based cognitive behavioral therapy; T-CT = telephone based cognitive therapy; T-SEFT, telephone administered supportive emotion-focused therapy; VPMI, Vanderbilt pain management inventory; WFI, telephone-based work-focused intervention counseling based on CBT.

TABLE 2 Quality assessment of randomized controlled trial with Jadad scale.

Study	Randomization	Appropriate Randomization	Blinding	Appropriate blinding	Dropouts and withdrawals	Jadad scale total score
Adler et al. (2015)	Yes	Yes	No	No	Yes	3
Alcántara et al. (2016)	Yes	No	Not reported	Not reported	Not reported	1
Allen et al. (2016)	Yes	Yes	Yes	No	Yes	4
Ang et al. (2010)	Yes	No	No	No	Yes	2
Arnedt et al. (2013)	Yes	Yes	Not reported	Not reported	Yes	3
Brenes et al. (2012)	Yes	No	Not reported	Not reported	Not reported	1
Cassin et al. (2016)	Yes	Yes	No	No	Yes	3
Dobkin et al. (2020)	Yes	Yes	Not reported	Not reported	Yes	3
Doyle et al. (2017)	Yes	Yes	Yes	No	Yes	4
Dwight-Johnson et al. (2011)	Yes	No	Not reported	Not reported	Yes	2
Gallegos et al. (2016)	Yes	No	Not reported	Not reported	Yes	2
Graser et al. (2020)	Yes	No	No	No	Yes	2
Himelhoch et al. (2013)	Yes	Yes	No	No	Yes	3
Laurel-Franklin et al. (2018)	Yes	No	No	No	Yes	2
Lovell et al. (2006)	Yes	No	No	No	Yes	2
Ludman et al. (2007)	Yes	Yes	Yes	No	Yes	4
McAndrew et al. (2018)	Yes	Yes	No	No	Yes	3
McBeth et al. (2012)	Yes	Yes	Yes	No	Yes	4
Mohr et al. (2005)	Yes	No	Yes	No	Yes	3
Mohr et al. (2011)	Yes	No	No	No	Yes	2
Napolitano et al. (2002)	Yes	No	No	No	Yes	2

(Continues)

TABLE 2 (Continued)

| Study	Randomization	Appropriate Randomization	Blinding	Appropriate blinding	Dropouts and withdrawals	Jadad scale total score
Ngai et al. (2015)	Yes	Yes	Yes	No	Yes	4
Ngai et al. (2017)	Yes	Yes	Not reported	Not reported	Yes	3
Nicholas et al. (2021)	Yes	Yes	Yes	No	Yes	4
Olthuis et al. (2014)	Yes	Yes	Yes	No	Yes	4
Olthuis et al. (2015)	Yes	Yes	Not reported	Not reported	Yes	3
Piette et al. (2011)	Yes	Yes	Not reported	Not reported	Yes	3
Stecker et al. (2014)	Yes	Yes	Not reported	Not reported	Yes	3
Vander Weg et al. (2016)	Yes	Yes	Not reported	Not reported	Yes	3
Vázquez et al. (2020)	Yes	Yes	Yes	No	Yes	4
Watson et al. (2017)	Yes	No	Not reported	Not reported	Not reported	1
Yeung et al. (2022)	Yes	Yes	Yes	No	Yes	4
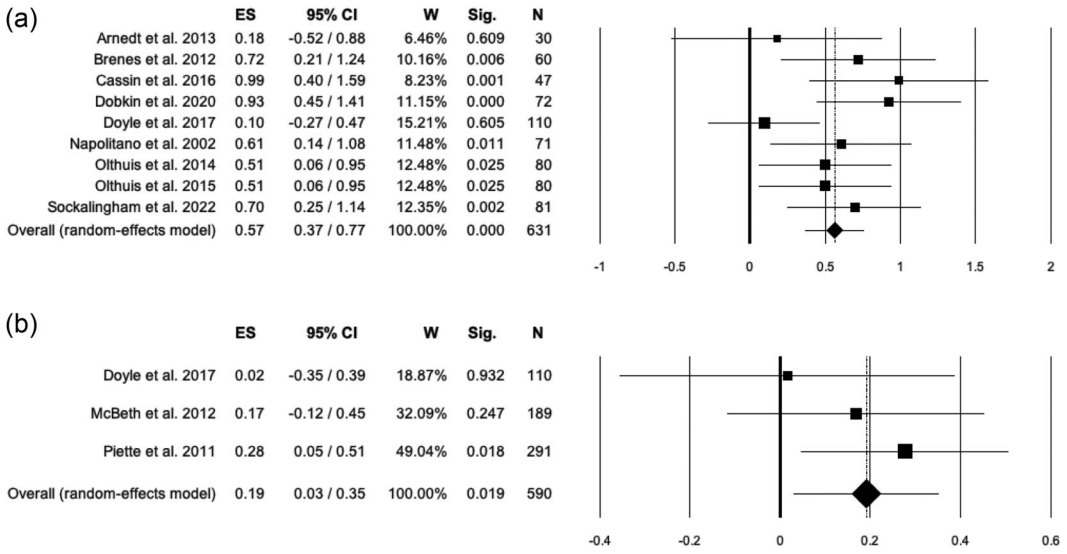
FIGURE 2 Forest plot for anxiety (a) and coping (b). 95% CI, confidence interval; ES, effect size; N, total sample size; Sig., statistical significance; W, weight.
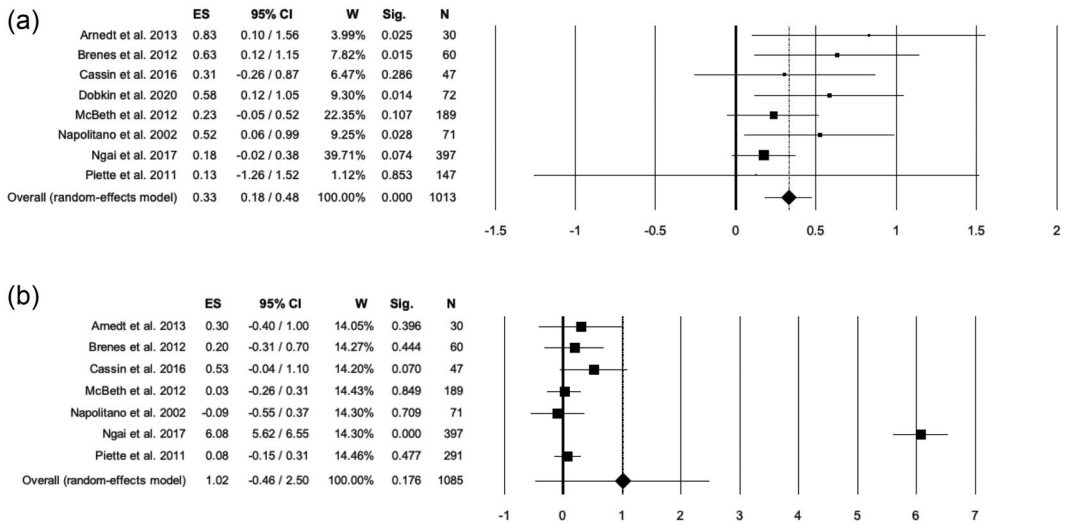

FIGURE 3 Forest plot for mental quality of life (QoL) (a) and physical QoL (b). 95% CI, confidence interval; ES, effect size; N, total sample size; Sig., statistical significance; W, weight.

Physical QoL: the ES of the efficacy comparison between T-CBT and TAU on physical QoL was not significant ($N = 1085$; $k = 7$; $g = 1.02$, 95% CI [−0.46 to 2.50]; $p = 0.176$). Interstudy heterogeneity was significant and high ($Q = 577.19$, $df = 6$, $p < 0.001$, $I^2 = 98.96$), whereas the publication bias did not reach the statistical significance ($t = 0.74$ $p = 0.494$) (Figure 3b).

Sleep disturbances: a significant and small pooled ES was found ($N = 604$; $k = 4$; $g = 0.37$, 95% CI [0.01 to 0.72]; $p = 0.042$). Interstudy heterogeneity was moderate ($Q = 10.69$, $df = 3$, $p = 0.014$, $I^2 = 71.93$), whereas publication bias ($t = −0.33$, $p = 0.770$) was not significant (Figure 4a).
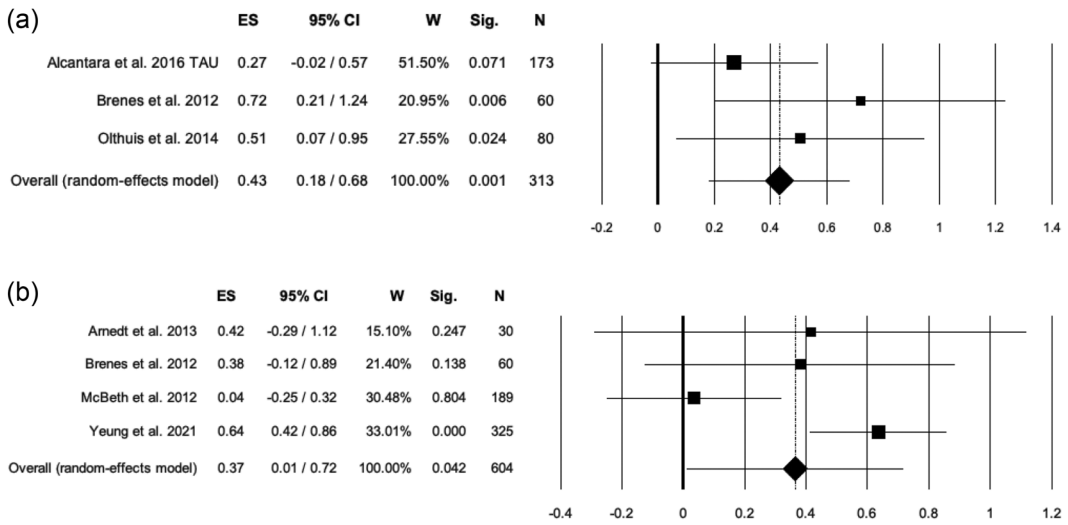
(a)

	ES	95% CI	W	Sig.	N
Alcantara et al. 2016 TAU	0.27	-0.02 / 0.57	51.50%	0.071	173
Brenes et al. 2012	0.72	0.21 / 1.24	20.95%	0.006	60
Olthuis et al. 2014	0.51	0.07 / 0.95	27.55%	0.024	80
Overall (random-effects model)	0.43	0.18 / 0.68	100.00%	0.001	313

(b)

	ES	95% CI	W	Sig.	N
Arnedt et al. 2013	0.42	-0.29 / 1.12	15.10%	0.247	30
Brenes et al. 2012	0.38	-0.12 / 0.89	21.40%	0.138	60
McBeth et al. 2012	0.04	-0.25 / 0.32	30.48%	0.804	189
Yeung et al. 2021	0.64	0.42 / 0.86	33.01%	0.000	325
Overall (random-effects model)	0.37	0.01 / 0.72	100.00%	0.042	604

FIGURE 4 Forest plot for sleep disturbances (a) and worry (b). 95% CI, confidence interval; ES, effect size; N, total sample size; Sig., statistical significance; W, weight.

Worry: the pooled ES was low and significant ($N = 313$; $k = 3$; $g = 0.43$, 95% CI [0.18 to 0.68]; $p = 0.001$); the interstudy heterogeneity ($Q = 2.39$, $df = 2$, $p = 0.303$, $I^2 = 16.26$) and publication bias ($t = 7.30$, $p = 0.087$) did not reach statistical significance (Figure 4b).

Depression: the pooled ES was significant and large ($N = 3436$; $k = 23$; $g = 0.84$, 95% CI [0.44 to 1.24]; $p < 0.001$), with high and significant interstudy heterogeneity ($Q = 655.2$, $df = 22$, $p < 0.001$, $I^2 = 96.64$) and a nonsignificant publication bias ($t = 1.66$, $p = 0.112$). The sensitivity analysis revealed that removing each study, one at a time, did not reduce the level of interstudy heterogeneity. The funnel plot analysis led to the removal of three studies causing asymmetry in the funnel plot (Dwight-Johnson et al., 2011; Ngai et al., 2015; Vázquez et al., 2020). After the removal of these studies, the ES remained significant, but its magnitude became small ($N = 2789$; $k = 20$; $g = 0.28$, 95% CI [0.15 to 0.41]; $p < 0.001$), with a moderate interstudy heterogeneity ($Q = 50.20$, $df = 19$, $p < 0.001$, $I^2 = 62.15$) and a nonsignificant publication bias ($t = 1.02$, $p = 0.321$) (Figure 5a).

Overall analysis: By combining the ESs coming from each comparison between T-CBT and TAU, the overall pooled ES was significant and moderate ($N = 7684$; $k = 58$; $g = 0.66$, 95% CI [0.43 to 0.90]; $p < 0.001$). Interstudy heterogeneity was significant and high ($Q = 1292.70$, $df = 57$, $p < 0.001$, $I^2 = 95.59$). The sensitivity analysis revealed that, by excluding each study at the time, the ES and interstudy heterogeneity did not decrease. Finally, the publication bias was not significant ($t = 1.98$, $p = 0.053$).

3.3 | Meta-analysis comparing the efficacy of T-CBT and CBT on psychological outcomes

Due to lack of primary studies, it was not possible to analyze the following outcomes: anxiety, coping, physical and mental QoL, and sleep disturbances.

Depression: the five studies comparing the efficacy of T-CBT and CBT on levels of depression revealed a not significant pooled ES ($N = 552$; $k = 5$; $g = 0.06$, 95% CI [-0.10 to 0.23]; $p = 0.466$). Neither the interstudy heterogeneity ($Q = 2.34$, $df = 4$, $p = 0.673$, $I^2 = 0$) nor the publication bias ($t = -1.09$, $p = 0.287$) were significant (Figure 5b).
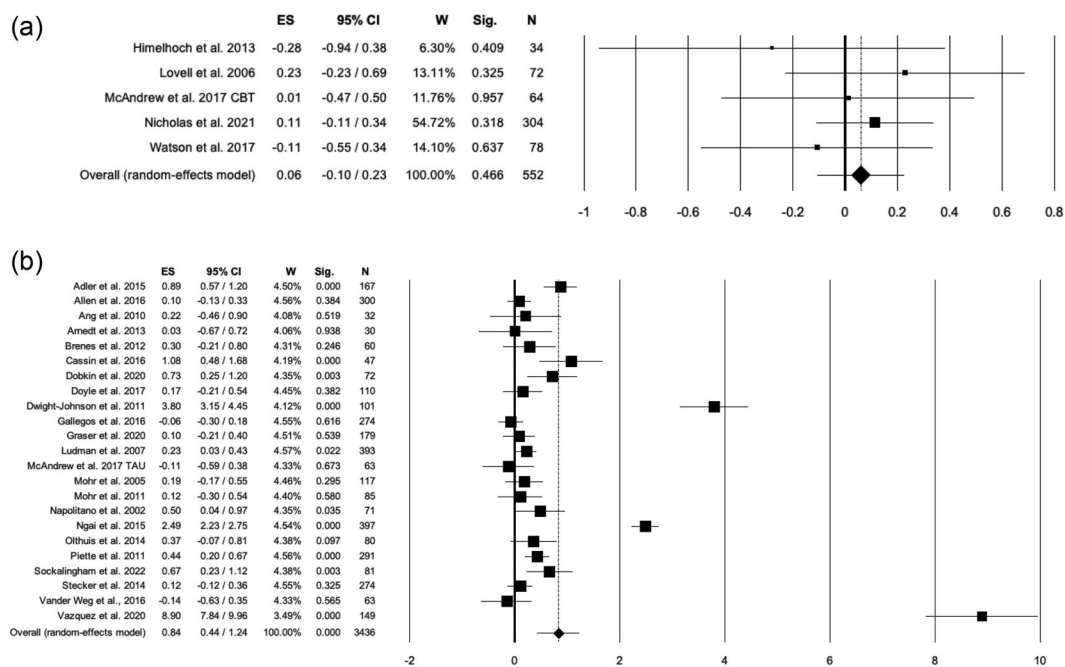
(a)

	ES	95% CI	W	Sig.	N
Himelhoch et al. 2013	-0.28	-0.94 / 0.38	6.30%	0.409	34
Lovell et al. 2006	0.23	-0.23 / 0.69	13.11%	0.325	72
McAndrew et al. 2017 CBT	0.01	-0.47 / 0.50	11.76%	0.957	64
Nicholas et al. 2021	0.11	-0.11 / 0.34	54.72%	0.318	304
Watson et al. 2017	-0.11	-0.55 / 0.34	14.10%	0.637	78
Overall (random-effects model)	0.06	-0.10 / 0.23	100.00%	0.466	552

(b)

	ES	95% CI	W	Sig.	N
Adler et al. 2015	0.89	0.57 / 1.20	4.50%	0.000	167
Allen et al. 2016	0.10	-0.13 / 0.33	4.56%	0.384	300
Ang et al. 2010	0.22	-0.46 / 0.90	4.08%	0.519	32
Arndt et al. 2013	0.03	-0.67 / 0.72	4.06%	0.938	30
Brenes et al. 2012	0.30	-0.21 / 0.80	4.31%	0.246	60
Cassin et al. 2016	1.08	0.48 / 1.68	4.19%	0.000	47
Dobkin et al. 2020	0.73	0.25 / 1.20	4.35%	0.003	72
Doyle et al. 2017	0.17	-0.21 / 0.54	4.45%	0.382	110
Dwight-Johnson et al. 2011	3.80	3.15 / 4.45	4.12%	0.000	101
Gallegos et al. 2016	-0.06	-0.30 / 0.18	4.55%	0.616	274
Graser et al. 2020	0.10	-0.21 / 0.40	4.51%	0.539	179
Ludman et al. 2007	0.23	0.03 / 0.43	4.57%	0.022	393
McAndrew et al. 2017 TAU	-0.11	-0.59 / 0.38	4.33%	0.673	63
Mohr et al. 2005	0.19	-0.17 / 0.55	4.46%	0.295	117
Mohr et al. 2011	0.12	-0.30 / 0.54	4.40%	0.580	85
Napolitano et al. 2002	0.50	0.04 / 0.97	4.35%	0.035	71
Ngai et al. 2015	2.49	2.23 / 2.75	4.54%	0.000	397
Olthuis et al. 2014	0.37	-0.07 / 0.81	4.38%	0.097	80
Piette et al. 2011	0.44	0.20 / 0.67	4.56%	0.000	291
Sockalingham et al. 2022	0.67	0.23 / 1.12	4.38%	0.003	81
Stecker et al. 2014	0.12	-0.12 / 0.36	4.55%	0.325	274
Vander Weg et al., 2016	-0.14	-0.63 / 0.35	4.33%	0.565	63
Vazquez et al. 2020	8.90	7.84 / 9.96	3.49%	0.000	149
Overall (random-effects model)	0.84	0.44 / 1.24	100.00%	0.000	3436

FIGURE 5 Forest plot for depression (telephone-delivery cognitive behavioral therapy [T-CBT] vs. treatment as usual [TAU]) (a) and depression (T-CBT vs. CBT) (b). 95% CI, confidence interval; ES, effect size; N, total sample size; Sig., statistical significance; W, weight.

All meta-analytic results are shown in Table 3.

4 | DISCUSSIONS AND CONCLUSIONS

The present meta-analytic study aimed at evaluating the efficacy of T-CBT in reducing levels of psychological distress by comparing it to other interventions (TAU or face-to-face CBT). As for the meta-analysis on studies comparing the efficacy of T-CBT and TAU interventions, the results revealed a large ES on depression outcome, a moderate ES on anxiety outcome, and a small ES on coping strategies, mental QoL, sleep disturbances, and worry outcomes. On the other hand, no differences between T-CBT and TAU groups were found on physical QoL. Finally, the meta-analysis combining all outcomes revealed a moderate overall ES.

Overall, these results may suggest that T-CBT has a greater efficacy, when compared to TAUs, in reducing psychological symptomatology, and that it can be beneficial especially on specific psychological disorders, in particular in treating symptoms related to depression, anxiety, worry, and sleep disturbances. This finding may be of paramount importance, since these psychological conditions are especially elevated in chronic and mental diseases and are related to poorer health and self-management of the disease (DeJean et al., 2013; Moussavi et al., 2007; Papaleontiou et al., 2019).

In more detail, the largest ES was found for the depression outcome: T-CBT seemed to have a higher efficacy, compared to TAU condition, in lowering levels of depression in people with chronic disease and/or mental illnesses. Depressive symptomatology is frequent in people with chronic diseases and its prevalence is superior to general population; this is true even for nonfatal chronic diseases (Alkhiari, 2023; Jafferany & Pastolero, 2018). Moreover, people with depression are at higher risk of suicide ideation or attempt (Heinrich et al., 2022; Ribeiro et al., 2018; Tsai et al., 2022), and thus alternative ways of providing CBT, such as T-CBT, are needed to treat all people at risk,

TABLE 3 Summary of meta-analytic results.

Domains/ Outcomes	K	N	Pooled ES in Hedges'g (p)	95% confidence intervals		Heterogeneity statistics			Egger's t-test for publication bias (p)	Trim and fill
				LL	UL	Q (df)	p	I^2		
Meta-analysis comparing the efficacy of T-CBT and TAU on psychological outcomes										
Anxiety	9	631	0.57 (<**0.001**)	0.37	0.77	12.22 (8)	0.142	34.52	1.16 (0.285)	0
Coping	4	594	0.20 (**0.016**)	0.04	0.36	1.61 (3)	0.658	0	−0.06 (0.960)	1
Depression	23	3436	0.84 (<**0.001**)	0.44	1.24	655.2 (22)	**<0.001**	96.64	1.66 (0.112)	0
Mental QoL	8	1013	0.33 (<**0.001**)	0.18	0.48	7.66 (7)	0.363	8.62	2.32 (0.059)	3
Physical QoL	7	1085	1.02 (0.176)	−0.46	2.50	577.19 (6)	**<0.001**	98.96	0.74 (0.494)	0
Sleep disturbances	4	604	0.37 (**0.042**)	0.01	0.72	10.69 (3)	**0.014**	71.93	−0.33 (0. 770)	2
Worry	3	313	0.43 (**0.001**)	0.18	0.68	2.39 (2)	0.303	16.26	7.30 (0.087)	2
Meta-analysis comparing the efficacy of T-CBT and CBT on psychological outcomes										
Depression	5	552	0.06 (0.466)	−0.10	0.23	2.34 (4)	0.673	0	−1.09 (0.287)	0

Note: Statistically significant values are reported in bold. Abbreviations: Df, degrees of freedom; ES, effect size; K, number of studies; LL, lower limit; N, total number of participants; Q and I^2, heterogeneity statistics; QoL: quality of life; TAU, treatment as usual; T-CBT, telephone-based cognitive behavioral therapy; UP, upper limit.

even those who are not able to reach the therapist's office or if they do not have internet access for tele-conferencing CBT. Our results may corroborate the idea that T-CBT can be successfully employed with this category of patients, and it may have a higher efficacy than TAUs.

As regards the comparison of efficacy between T-CBT versus TAU conditions in treating anxiety and worry, the overall ES was moderate and revealed that T-CBT reduced significantly more levels of anxiety and worry with respect to TAU. Although the etiology of anxiety and worry is multifactorial, intolerance of uncertainty may play a major role in anxiety disorders (Grupe & Nitschke, 2013): in particular, uncertainty has been considered a trigger of worrying thoughts, and uncertainty tolerance may be a risk factor of anxiety (Chen et al., 2018). Moreover, in chronic diseases, often characterized by an unpredictable disease course, several people may have trouble in managing the illness-related uncertainty, and therefore they may experience higher levels of anxiety, with a negative impact not only on their mental QoL, but also on management of their disease (Brown et al., 2020). Therefore, T-CBT may provide efficient strategies to manage uncertainty and consequently ameliorate patients' anxiety and QoL.

Moreover, these results may demonstrate that T-CBT can also be more beneficial, with respect to TAUs, in increasing the ability to cope against stressful and uncertain situations. The role of coping strategies on psychological outcomes in patients with chronic and mental diseases is very important, since stressors associated with living with a chronic and/or mental disease may be very demanding; moreover, an association between adaptive coping abilities, well-being, and illness representation in these population is well known (Macía et al., 2021; Richardson et al., 2017; Schreurs, 1997). Taking into account this information, a T-CBT intervention may help these patients in developing or potentiating more functional strategies to cope with stressful situations, with a possible impact on their well-being.

We also provided evidence that T-CBT intervention may increase mental QoL at follow-up evaluation, and its efficacy is superior to TAU; this aspect may be of paramount importance, since levels of QoL in people with chronic and mental diseases are consistently lower than healthy individuals and several studies found that lower levels of QoL may predict a faster decline in these patients (Beaudart et al., 2018; Firkins et al., 2020; Knowles et al., 2018).

On the other hand, nonsignificant ES were found in levels of physical QoL, revealing no differences in terms of efficacy between the T-CBT and TAU conditions. However, it has to be noted that only seven studies compared the efficacy of T-CBT against TAU. Moreover, some primary studies found indeed a higher efficacy of T-CBT compared to TAU (Brenes et al., 2012; Ngai et al., 2017), whereas others did not (Arnedt et al., 2013; Cassin et al., 2016; McBeth et al., 2012; Napolitano et al., 2002; Piette et al., 2011). So, even if the present meta-analytic study failed to find a significant ES for this outcome, more studies with larger samples and a RCT design should be performed to further investigate this issue.

Finally, as regards the efficacy of T-CBT on sleep disturbances compared to TAU condition, a significant but small ES was found. Sleep disorders are frequently associated with psychological illnesses; for example, sleep alterations and reduced sleep continuity were observed in most mental disorders (Baglioni et al., 2016); moreover, a bidirectional association between sleep disturbances and depression is well-known in literature, and, in general, some sleep disorders such as insomnia may exacerbate psychiatric symptoms (Fang et al., 2019; Khurshid, 2018) These associations have been demonstrated also in people with chronic diseases (e.g., see Gao et al., 2022; Irwin et al., 2013; Keskindag & Karaaziz, 2017; Laslett et al., 2022). Indeed, several studies found that sleep disorders in these patients may cause not only a reduction of their quality of life, but also of their physical functions by impacting on levels of fatigue and their threshold of pain perception (Gao et al., 2022; Hamdi et al., 2021; O'Brien et al., 2022; Teo et al., 2022). However, it must be noted that only four studies addressed the efficacy of T-CBT versus TAU condition on psychological outcomes, so our results are preliminary, and they should be taken with caution. Therefore, future studies are needed on this important issue. Nonetheless, given the extensive cognitive, psychological, and physical consequences of poor quality of sleep reported above, these preliminary results may still prompt clinicians to activate specific T-CBT programs to treat people with sleep disturbances who are not able to reach the therapist's office.

As regards the meta-analysis comparing the efficacy of T-CBT and face-to-face CBT on psychological outcomes, we could only perform a comparison on depression outcome and found no differences in levels of depressive symptomatology in T-CBT and CBT groups. Considering that live CBT is considered an efficient treatment for depression (Layard & Clark, 2014), and its efficacy on depressive symptoms was confirmed also in populations with chronic diseases (Fernie et al., 2015). Therefore, this finding may support the hypothesis that T-CBT may not be inferior to traditional CBT in treating depression in chronic and mental diseases. T-CBT could be a valid substitute of traditional CBT when it cannot be delivered due to exceptional circumstances (i.e., pandemic, large-scale crisis, earthquakes, and so on). Moreover, it can be successfully and easily employed on people in need of psychological support who neither are able to reach the therapist's office (due to higher levels of disability or to long distance to the office), nor they have internet access or video conferencing equipment, impeding the delivery of video-conference CBT.

However, also given the small number of studies addressing the comparison between live CBT and T-CBT, one should not overlook the fact that some communication channels are not available in T-CBT (i.e., nonverbal communication, the ability of making eye-contact). The interplay of nonverbal and verbal communication and the observation of these factors is of great importance for psychotherapists, as it may provide useful information both in the assessment and in the following steps of therapy (Foley & Gentile, 2010). Moreover, verbal and nonverbal exchanges between the patient and the psychotherapist may help strengthening the therapeutic alliance (Del Giacco et al., 2020; Westland, 2015). Therefore, also given the paucity of studies comparing live CBT and T-CBT, when it is possible, live or video-conference CBT should be preferred. Alternatively, T-CBT could be employed in the specific cases listed above, or for follow-up sessions after the initial traditional or video-conference CBT.

It should also be noted that these results should be taken into account also considering that not all RCTs were of high quality. In particular, all primary studies in this meta-analysis did not perform (or did not report) an appropriate blinding procedure. This is a known issue in psychotherapy research, since RCT on psychotherapy cannot be double-blinded, and single-blind studies are rarely performed (Berger, 2015). This aspect should be considered with special attention in future studies, conducted with more rigorous procedures to reduce all possible risks of bias and provide high-quality evidence.

Another limitation of this meta-analytic study is related to the fact that all included primary studies were published in reviewed scientific journals only, and no gray literature was included. Although the publication bias was not significant in all examined outcomes, we cannot exclude that this choice could have determined a bias toward studies confirming a superiority in efficacy of T-CBT against TAU, or an equivalence of efficacy between T-CBT and CBT. Therefore, results should be interpreted with caution. Moreover, some meta-analyses on specific outcomes were conducted on a limited number of primary studies, and this may have reduced the quality of evidence. Therefore, more studies are needed.

Nonetheless, we believe that this study provided evidence that T-CBT can be considered an adequate psychotherapy treatment for people with chronic and/or mental diseases, as it was found to be more effective than TAU conditions in multiple psychological outcomes, and as efficient as face-to-face CBT in treating depression. Therefore, T-CBT can be taken into consideration as not only a valid option to provide a better access to evidence-based treatments in ordinary and extraordinary situations, but it may also have a positive impact on the reduction of the economic burden of national healthcare systems.

AUTHOR CONTRIBUTIONS

Manuela Altieri and Maria R. Sergi designed the study, conducted the statistical analyses, interpreted the data, and drafted the manuscript; Marco Tommasi, Gabriella Santangelo, and Aristide Saggino contributed toward drafting and revising the paper and agreed to be accountable for all aspects of the work.

CONFLICT OF INTEREST STATEMENT

The authors declare no conflict of interest.

DATA AVAILABILITY STATEMENT

The data that support the findings of this study are available from the corresponding author upon reasonable request.

ETHICS STATEMENT

Ethical committee approval was not required since primary studies already obtained ethics approval.

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PEER REVIEW

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