Received: 13 March 2019 | Revised: 18 April 2019 | Accepted: 19 April 2019

DOI: 10.1002/capr.12228

REVIEW

WILEY

Dialectical behaviour therapy and 12-step programmes for substance use disorder: A systematic review and meta-analysis

Ezechiele Giannelli[1] | Christian Gold[2] | Lucja Bieleninik[2,3] | Claire Ghetti[2] | Omar C. G. Gelo[1,4]

[1]Department of History, Society and Human Studies, University of Salento, Lecce, Italy

[2]GAMUT, The Grieg Academy – Department of Music, University of Bergen, Bergen, Norway

[3]Institute of Psychology, University of Gdansk, Gdansk, Poland

[4]Faculty of Psychotherapy Science, Sigmund Freud University, Vienna, Austria

Correspondence
Omar C. G. Gelo, Department of History, Social Sciences and Human Studies, Via di Valesio – Complesso Studium 2000, Ed. 5, 73100 Lecce, Italy.
Emails: omar.gelo@unisalento.it; omar.gelo@sfu.ac.at

Funding information
This research did not receive any specific funding from agencies in the public, commercial or not-for-profit sectors.

Abstract

Background: Research on dialectical behaviour therapy (DBT) or 12-step programmes has shown inconclusive results; no systematic review has directly compared the two.

Objectives: The goals of this meta-analytic review were to assess if DBT is more effective than treatment as usual (TAU) and if DBT is more effective than 12-step programmes (including twelve-step facilitation [TSF] and self-help groups like Alcoholics Anonymous) for substance use disorder (SUD).

Methods: We searched for randomised controlled trials (RCTs) and extracted data on the following outcomes: reduction in substance use, retention in treatment, severity of substance dependence/abuse and severity of mental health symptoms. Studies involved adult (>18 years) women with SUD, according to DSM-5 or the equivalent diagnoses in DSM-IV. Three RCTs met the inclusion criteria and contained appropriate data for meta-analysis (75 participants).

Results: No significant effects of DBT have been found compared to 12-step programmes. Comparing DBT with TAU, we found a beneficial short-term (1 RCT, $n = 12$, $SMD = -0.84$; 95% CI [−1.64, −0.04]) and long-term (2 RCTs, $n = 29$, $SMD = -1.26$; 95% CI [−2.13, −0.40]) effect of DBT on severity of substance use.

Conclusions: Despite the limited evidence of the present review, contextual evidence supports DBT and 12-step programmes. RCTs with larger sample sizes are needed to better elucidate the impact of both treatments on SUD and facilitate the comparison between DBT and 12 steps programmes.

KEYWORDS

12-step programmes, alcoholics anonymous, dialectical behaviour therapy, meta-analysis, review, substance use abuse

1 | BACKGROUND

Problematic substance use negatively impacts individuals, families and public health. In 2012, 3.3 million deaths were attributable to the harmful use of alcohol, representing 5.9% of all deaths (World Health Organization, 2014, 1994). Substance use disorders (SUDs) may be defined as the use of one or more psychoactive substances, either medically prescribed or not, which causes significant clinical and functional impairment, such as health problems, disability and failure at work, school or home (WHO, 2014). In the fifth version of the diagnostic and statistical manual (American Psychiatric Association, 2013), the previous categories of substance abuse and substance dependence were replaced by a single category of substance use disorder. The symptoms associated with SUDs are grouped into four categories: impaired control,

social impairment, risky use and pharmacological criteria (i.e., tolerance and withdrawal; American Psychiatric Association, 2013).

Problematic substance use places considerable strain on society and public health services, necessitating considerable resources be allotted for prevention, education and all phases of treatment. The cost of untreated and continuing disordered or unhealthy use is greater than investment in treatment (International Narcotics Control Board, 2013).

Due to the substantial costs associated with SUD, there is strong political interest in reducing harm to society and in identifying effective treatments. Common forms of treatment include cognitive-behavioural therapies, motivational enhancement, contingency management, psychoanalysis, network therapy, and 12-step programmes (Galanter & Kleber, 2008), and dialectical behaviour therapy (DBT; Dimeff & Linehan, 2008). The main focus of this review is on DBT and 12-step programmes, which, respectively, represent the most recent and the most time-tested approaches for managing SUD.

Twelve-step programmes are self-help groups aimed at promoting and supporting complete abstinence from use of illicit drugs or alcohol. Alcoholics Anonymous (AA) is the most known and first and oldest 12-step programme, which developed in the first half of the 20th century. Narcotics Anonymous (NA) has been developed for people with various substance abuse issues and follows the 12-step model. NA is the second-largest 12-step organisation after AA. Twelve-step facilitation (TSF) is a treatment programme based on the 12-step approach and is typically of limited duration and offered by trained professionals within a treatment facilitation centre. Twelve-step self-help groups grew out of a religio-spiritual tradition rather than an academic or scientific one. Such programmes attribute the possibility of recovery to the process of psychic change (Kelly & Greene, 2013), spiritual experience or spiritual awakening (Kelly & Greene, 2013) that occurs during completion of the 12 steps. Such programmes also advocate sponsorship, in which a person who is stable in recovery helps support another recovering member through the 12 steps (Laudet, 2008). The core principles of voluntary and anonymous participation and guidance from non-professional individuals increase the variability and heterogeneity of this intervention form. Moreover, it can be difficult to extract a precise description of the 12 step's change processes and mechanism from its reference texts (e.g., Wilson, 1939). Thus, empirical research on 12-step programmes is complicated by these characteristics. Major predictors of improvement within 12-step programmes are self-efficacy and the confidence to remain abstinent (MATCH, 1997; Moos & Timko, 2008). The importance of spirituality for extended abstinence is currently unclear (Maude-Griffin et al., 1998; Moos & Timko, 2008; Tonigan & Connors, 2008). We found a Cochrane review of 12-step programmes (Ferri et al., 2006) in which no study unequivocally demonstrated the effectiveness of AA for SUD.

Dialectical behaviour therapy is a form of "third wave" cognitive therapy originally developed for people with borderline personality disorder (BPD) and suicidal behaviour (Linehan, 1993), but later used also for people with SUDs (Dimeff & Linehan, 2008). This was predicated on the theory of addictive behaviour known as the "self-medication hypothesis," which asserts that individuals use alcohol and drugs to modulate their emotional states (Khantzian & Schneider, 1986). The self-medication hypothesis is consistent with DBT's biosocial theory, which views emotion dysregulation as a central element contributing to BPD-criterion behaviours. Research supports this view, as negative emotional states are linked with increased substance use, and substance users demonstrate difficulty with regulating affective states (Bradley, Gossop, Brewin, & Phillips, 1992; Cummings, Gordon, & Marlatt, 1980; Kushner, Sher, & Beitman, 1990). Thus, DBT treatment used with SUDs is consistent with standard DBT treatment for BPD, focusing on reducing behavioural dyscontrol (e.g., substance abuse, self-injurious or suicidal behaviour, and extreme behaviours that interfere with therapy or with quality of life), and teaching more adaptive behaviour and thinking patterns (Linehan, 2014). From this perspective, substance use is viewed as a learned behaviour that serves to regulate emotions during periods of dysregulation. The full standard DBT protocol includes five treatment modalities: individual therapy, group skills training, 24-hr phone consultation, case management and a therapist consultation team (Linehan, 2014). Group skills training consists of four modules: mindfulness skills, distress tolerance, emotional regulation and interpersonal effectiveness.

Both DBT and 12-step programmes view SUD as a disease rather than evidence of human inadequacy and emphasise abstinence as the ultimate goal of treatment. Both treatments emphasise the importance of generating a supportive community to facilitate the recovery process, and both follow a similar philosophy that accepts the limitations of being human (Dimeff & Koerner, 2007). In DBT, this philosophy is expressed in the acceptance–change dialectic polarity, called "dialectical abstinence," and in 12-step programmes, it is expressed in the first step of the 12 steps and in the serenity prayer (Dimeff & Koerner, 2007). Both models focus on behaviour change, development of activities that are not compatible with drinking and drug use, and identification and modification of dysfunctional cognitions and behaviours (McCrady, 1994). In spite of these similar philosophical foundations, the two approaches are markedly different. DBT emphasises individual psychotherapy sessions to improve the client motivation to work. Use of telephone consultations ensures generalisation of skills and effective implementation of problem-solving strategies in daily life, while weekly consultation team meetings help enhance each therapist's own motivation and capability to effectively treat clients.

While 12-step programmes have been used extensively over the last 50 years, DBT is a recent approach. The evidence remains inconclusive for both. Twelve-step programmes have been investigated in a number of RCTs since 1967 (e.g., see Ditman, Crawford, Forgy, Moskowitz, & Macandrew, 1967 for a review). Most of these RCTs have shown inconclusive results. To date, there are three reviews of 12-step programmes for SUDs. A Cochrane systematic review included 8 RCTs of 12-step programmes for alcohol dependence and concluded that these studies failed to demonstrate effectiveness, because 12-step programmes were not more effective than comparison interventions, such as motivational enhancement therapy (MET), cognitive-behavioural coping skills training (CBST) and relapse prevention therapy

(RPT; Ferri, Amato, & Davoli, 2006). In a review of 11 randomised and quasi-experimental studies (Q-ES), Nielsen et al. (2014) did not report overall effect sizes, but concluded that there was some evidence of a generally positive effect of 12-step programmes and comparison conditions in reducing drug use, with two particular studies demonstrating that 12-step programmes are more effective than comparison (Carroll, Kathleen, Charla Nich, Ball, McCance, Frankforter & Rounsavile, 1998; Carroll et al., 2012). A recent systematic review of 12-step programmes for illicit drug use included 10 studies, using RCT and Q-ES, but found no significant differences between 12-step programmes and the comparison conditions, such as treatment as usual (TAU), cognitive-behavioural therapy (CBT), clinical management (CIM), RPT and acceptance and commitment therapy (ACT; Bøg, Filges, Brännström, Jørgensen, & Fredrikksson, 2017). In contrast to the results of these reviews, large observational studies have suggested beneficial effects of 12-step programmes (Emrick, Tonigan, Montgomery, & Little, 1993; Tonigan, Toscova, & Miller, 1996).

To date, we found one narrative review of DBT (Dimeff & Linehan, 2008) comprising nine RCTs, two of which were focused on people with SUD. Study authors concluded that DBT decreased substance abuse in patients with borderline personality disorder. To our knowledge, no systematic review with meta-analysis of DBT applied for SUD has been conducted to date.

There is a need of a rigorous systematic review with meta-analysis of DBT and 12-step programmes for SUD in order to assess their efficacy. The aim of this review was to examine the effects of DBT compared to 12-step programmes and compared to TAU, based on randomised trials and following the PRISMA statement for reporting of systematic reviews and meta-analyses.

2 | METHOD

We undertook a comprehensive search following guidelines outlined in the PRISMA Statement (Moher, Liberati, Tetzlaff, & Altman, 2009). Our original protocol also aimed to compare 12-step programmes versus TAU, and the searches were conducted accordingly. However, the searches revealed the existence of high-quality systematic reviews of 12-step versus TAU (Bøg et. al., 2017; Ferri et al., 2006) and no further RCTs of this comparison. Therefore, we re-focused the current review to compare DBT to either TAU or 12-step programmes.

2.1 | Eligibility criteria

2.1.1 | Types of studies to be included

We included RCTs to assess the effects of each treatment approach. We included both parallel group and crossover RCT designs. If crossover studies had been found, the first phase before crossover would have been included, thereby essentially reducing the crossover study to a parallel study and excluding the possibility of carryover effects which might occur due to learning. We planned to consider uncontrolled prospective studies of DBT separately in the narrative synthesis part of the review, but not in the meta-analysis, due to the methodological problems associated with this design type.

2.1.2 | Condition or domain being studied

SUD including alcohol.

2.1.3 | Participants/population

We included adults with problematic alcohol or drug use (e.g., cannabis, hallucinogens, inhalants, opioids, sedatives, stimulants and unknown substances), except tobacco/nicotine and caffeine, with a formal diagnosis of SUD according to the DSM-5 (or the equivalent diagnoses in DSM-IV, DSM-IV-TR or International Classification of Diseases). We excluded people with substance-induced psychotic disorder, because it may reflect a previous medical condition and could impact the ability to participate in group DBT. People with comorbid borderline personality disorder were not excluded: first, because of the large overlap between BPD and SUD (Dimeff & Linehan, 2008); second, because of the fact that clients treated with 12-step programmes usually do not receive any specific clinical diagnosis, given the fact that such programmes are mainly offered in non-clinical contexts.

2.1.4 | Interventions

We included DBT and 12-step programmes. DBT is a CBT that uses group skills training to reduce behavioural dyscontrol (e.g., suicidal and para-suicidal behaviour, substance use) and enhances emotion regulation (Dimeff & Linehan, 2008). Twelve-step programmes—such as AA, TSF and NA—are self-help groups aimed at achieving and maintaining abstinence, and reducing social problems related to substance consumption (Wilson, 1939).

2.1.5 | Comparator(s)/control

The comparator was TAU (i.e., formal treatment, compulsory inpatient treatment, formal community treatment and comprehensive validation therapy, which could include common treatment offerings such as case management, relapse prevention or motivational interview).

2.1.6 | Context

No particular setting was required. Relevant settings ranged from acute detoxification to long-term maintenance support programmes.

2.2 | Outcome(s)

2.2.1 | Primary outcomes

Data were extracted with regard to the following primary outcomes: (a) substance use (as measured by urinalysis or blood samples), (b) attrition of treatment (based on reported study dropout rates) and

(c) self-reported substance use/abuse, as measured by validated scales (e.g., Addiction Severity Index [ASI]; Drinking Inventory Consequences [DrInC]; Severity of Dependence Scale [SDS]).

2.2.2 | Secondary outcomes

Secondary outcome data were extracted on severity of mental health symptoms (continuous scores): (a) general symptoms (e.g., Symptom Checklist 90, SCL-90), (b) depression (e.g., Beck Depression Inventory, BDI), (c) anxiety (e.g., state portion of State-Trait Anxiety Inventory, STAI) and (d) anger (e.g., State-Trait Anger Expression Inventory, STAXI).

These outcomes were considered over the short term (up to 6 months from baseline), medium term (more than 6 and up to 12 months from baseline), and long term (more than 12 months from baseline).

2.3 | Search strategy

We searched the following electronic databases: MEDLINE, PsycINFO, EMBASE, CINAHL, WEB OF SCIENCE, EBSCO and registries of clinical trials, until 30 March 2017. The search strategy included terms relating to or describing the intervention ("dialectical behaviour therapy" OR "DBT skills training"), the trial design ("efficacy" OR "effectiveness") and population ("drug abuse" OR "substance abuse" OR "alcoholism" OR "alcohol use disorder" OR "substance use disorder" OR "alcoholics anonymous"). The search terms were adapted for use with other bibliographic databases in combination with database-specific filters for controlled trials, where these were available. There were no language or publication year restrictions. The database search was supplemented by handsearch of reference lists of the included review articles to identify any additional sources.

2.4 | Study selection

Titles and/or abstracts of studies were screened by one author to identify studies that potentially met the inclusion criteria. The full text of these potentially eligible studies was retrieved and assessed for eligibility by one review author. All included articles were double-checked by a second author, and any disagreements were resolved through discussion with a third reviewer. The two reviewers assessing the relevance of studies had knowledge about names of authors, affiliation, journal of publication and results when they examined studies for eligibility. When study reports contained insufficient information to determine eligibility, one reviewer contacted study authors for clarification. We sent a follow-up email after five business days, if there was no response to our initial email.

2.5 | Data collection process

A standardised, pre-piloted spreadsheet form was used to extract data from the included studies for assessment of study quality and to synthesise the data. Extracted information included the following: (a) study characteristics: study ID, year of publication; country; setting; study design; (b) overall sample: overall randomised and analysed sample size; sex; mean age; diagnosis at baseline; (c) details of the intervention and control conditions: description of the intervention; duration; total number of sessions; duration of follow-up; (d) outcomes, outcome measures and follow-up time points; and (e) information for risk assessment of bias (see 2.6 below). One reviewer extracted the data, which were double-checked by a second author, and any disagreements were resolved through discussion with a third reviewer. Missing data were requested from study authors via e-mail. For the convenience of authors, we provided labelled 2 × 2 tables they could fill in and send back to us. If there was no response to our initial email, after a minimum of five business days, we sent a second reminder email to the corresponding author. If we received an automated "out-of-office" response, we waited until the author had returned to send further reminders. After a minimum of 15 business days with no response from our initial email, we stopped requesting missing data.

2.6 | Risk of bias in individual studies

For parallel design studies we considered (a) randomisation sequence generation, (b) allocation concealment, (c) blinding, (d) completeness of outcome data, (e) selective outcome reporting and (f) other sources of bias. Similarly, the following characteristics would have been considered for crossover design studies: (a) appropriate crossover design, (b) randomisation of the ordering of treatments, (c) wash-out period, (d) allocation concealment, (e) blinding, (f) completeness of outcome data, (g) selective outcome reporting and (h) other sources of bias. The assessment was conducted by one reviewer (EG), double-checked by a second reviewer, and any disagreements were resolved through discussion with a third reviewer.

According to the Cochrane Collaboration's tool (Higgins et al., 2011), we defined a study as having an overall "high risk of bias" if it was judged as having a high risk in at least one out of six domains (random sequence generation, allocation concealment, blinding of participants and personnel, blinding of outcome assessors, incomplete outcome data, selective reporting). Low risk of bias was assigned if a study scored as low risk in all the domains.

2.7 | Data analysis

We provided a narrative synthesis of the findings from the included studies, structured around the type of participants, type and length of interventions (duration and number of sessions), and outcomes. We provided summaries of intervention effects for each study by calculating odds ratios for dichotomous outcomes and standardised mean differences for continuous outcomes. We used random-effects-meta-analysis to synthesise effects for each comparison, outcome and time point (short- to medium- to long term, one to 16 months), with odds ratios or standardised mean differences, and calculated 95% confidence intervals and two-sided *p*-values for all

outcomes. Heterogeneity between the studies was assessed using the *I*-squared statistic. An *I*-squared value greater than 50% has been considered indicative of substantial heterogeneity. We had planned to conduct subgroup analyses according to the duration of the intervention, but refrained from such analyses due to the limited number of studies identified.

3 | RESULTS

3.1 | Study characteristics

The literature search identified 6,020 publications (MEDLINE: 988; PsycINFO: 360; EMBASE: 2,440; Web of Science: 5; hand search: 10; EBSCO: 2,217). The last date of searching was 30 March 2017. After excluding duplicates (278) and obviously irrelevant papers (265), we obtained 21 full-text articles to assess for eligibility (Figure 1; Table S1). Of these, three met inclusion criteria and were included in the systematic review and provided sufficient data to include in quantitative synthesis (meta-analysis). We excluded three studies of DBT for people with BPD and SUD, where participants failed to meet our criteria for substance use disorder (or equivalent substance abuse diagnoses). The final sample included a total of three RCTs (75 participants) and no uncontrolled prospective studies of DBT versus TAU or 12-step programmes. TAU included motivational interviewing, cognitive behaviour therapy and relapse prevention strategies (Courbasson et al., 2012) and case management (Linehan et al., 1999). The mean age was 33.01 (range 18–45), and the sample was composed of women (100%). All three studies were conducted in the United States.

3.2 | Participant characteristics

All 75 participants of the three studies were diagnosed with SUD, including people with substance use exclusive of alcohol use (Courbasson, Nishikawa & Dixon, 2012; Linehan, Dimeff, Reynolds, Comtois, Welch, et al., 2002; Linehan et al., 1999).

Two studies recruited individuals in inpatient settings, in one study the setting was not specified (Linehan et al., 1999). The duration of DBT was on average fifty weeks, with the follow-up duration ranging from 12 to 64 weeks from baseline.

3.3 | Outcome characteristics

All three studies included in the meta-analysis examined our primary outcomes, self-reported substance use, substance use as measured by urinalysis and attrition (Table 1). We were unable to include any of the pre-specified secondary outcomes in meta-analysis due to insufficient reporting of data.

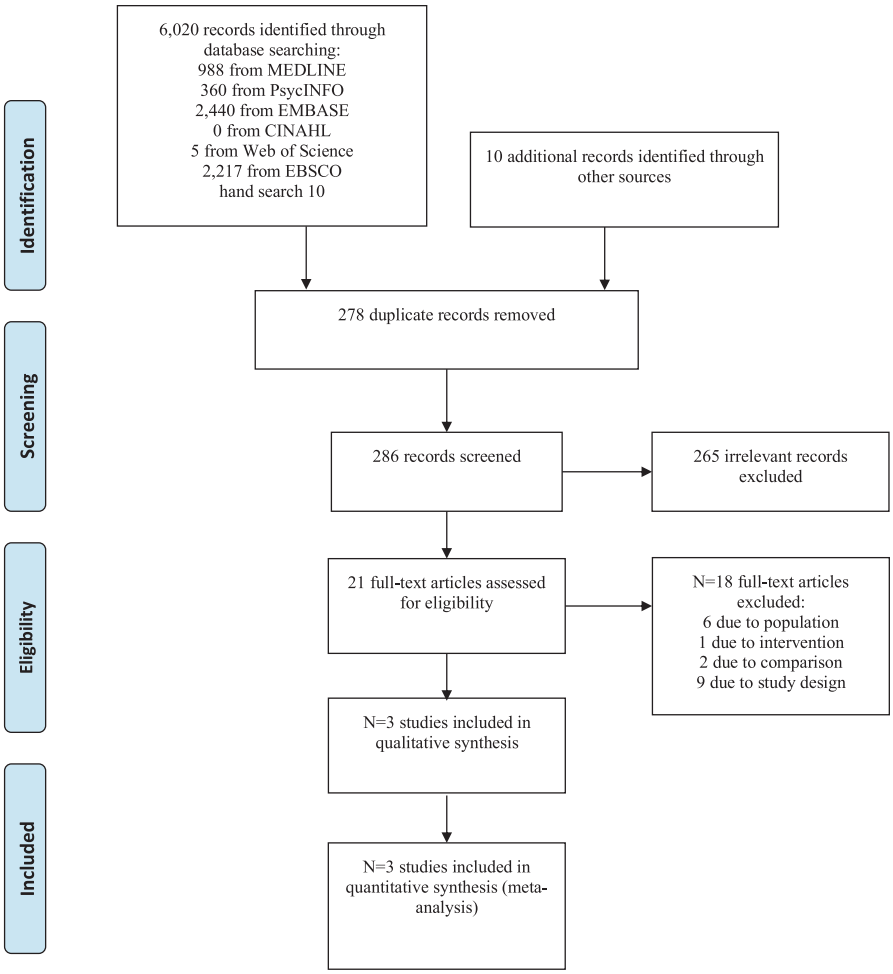

FIGURE 1 PRISMA flow chart

TABLE 1 Characteristics of RCTs of DBT versus TAU or 12-step programmes for people with SUD

Study					Participants				Intervention				Outcomes	
First author	Year	Country	Setting	Design (RCT, CCT, CS)	*N* of participants randomised (analysed)	Sex, *N* male (%)	Mean age (*SD* or range)	Diagnosis at baseline	Type of intervention	Total *N* of sessions (time, min)	Duration (weeks)	Comparison	Follow-up (weeks from baseline)	Measures
Courbasson	2012	Canada	Mental health clinic	RCT	25	0 (0)	32,53 (10,38)	Substance use disorder 100% (DSM-IV), eating disorder, 100% (DSM-IV)	DBT	48 (60 individual + 120 group week)	48	TAU (formal treatment)	12 and 24	(a) Substance use (Addiction Severity Index, ASI); (b) coping self-efficacy for substance users (drug-taking confidence questionnaire, DTCQ-8); (c) frequency and number of binge eating/purging episodes (eating disorder examination interview, EDE); (d) cognitive-behavioural examination (eating disorder examination, EDE); (e) negative affects (emotional eating scale, EES); (f) mood regulation (negative mood regulation, NMRS); (g) depression (Beck Depression Inventory, DBI)
Lineahn	1999	US	No specific setting	RCT	28 (27)	0 (0)	30,4 (6,6)	Substance use disorder 100% (DSM-III), borderline personality disorder 100%	DBT	(60 + 120 weeks)	48	TAU (community treatment)	16, 32 and 48	(a) Drug abuse (interviews, urine analyses); (b) social history (social history interview, SHI); (c) para-suicidal behaviours (para-suicide history interview, PHI); (d) adjustment (global adjustment scale, GAS); (e) social functioning (global social adjustment, GSA); (f) anger (state-trait anxiety expression inventory)
Linehan	2002	US	Health and abuse clinics	RCT	24 (23)	0 (0)	36,1 (7,3)	Opiate dependence 100%, borderline personality disorder (DSM-IV)	DBT	(40-90 individual + 150 group weeks)	48–56	CVT + TSF	64	(a) Drug abuse (urine analyses); (b) illicit drug use (timeline follow-back assessment method, TLFB); (c) para-suicidal behaviours (Para-suicide history interview, PHI); (d) adjustment (global adjustment scale, GAS); (e) social functioning (global social adjustment, GSA); (f) general psychiatric symptomatology (Brief Symptom Inventory, BSI)

Note: Uncontrolled studies and studies for other comparisons are reported in text.

Abbreviations: CT, controlled clinical trial; CS, case series; CVT, comprehensive validation therapy; DBT, dialectical behaviour therapy; RCT, randomised controlled trial; TSF, 12-step programmes; US, United States.

3.4 | Quantitative synthesis of main outcomes

We were able to include all three RCTs on DBT in the meta-analysis. Two studies compared DBT versus TAU and one compared DBT versus 12-step programmes.

3.4.1 | Comparison 1: DBT versus TAU

Self-reported substance use was measured by self-reported abstinent days and interviews. We found a different effect size at short term (1 RCT, n = 27, SMD = −0.84; 95% CI [−1.64, −0.04]) and a different effect size at long term (2 RCTs, n = 29 with 1 dropout, SMD = −1.26; 95% CI [−2.13, −0.40]) favouring DBT. At medium term, we found a non-significant effect (2 RCTs, n = 32, SMD = −1.43; 95% CI [−3.38, 0.51]; Figure 2). However, heterogeneity between the studies at medium term was substantial (I^2 = 66%); one study (Courbasson et al., 2012) suggested a positive effect of DBT for severity of substance use, whereas the other study did not (Figure 2).

Regarding substance use measured by mean percentage of clean urinalysis, we found no significant effects at short (1 RCT, n = 27, SMD = −0.42; 95% CI [−1.19, 0.35]), medium (1 RCT, n = 22, SMD = −0.19; 95% CI [−1.03, 0.65]), or long term (1 RCT, n = 24, SMD = −0.44; 95% CI [−1.25, 0.37]; Figure 3).

Regarding attrition, we found an overall significant effect favouring DBT (2 RCT, n = 26, OR = 0.12; 95% CI [0.03, 0.47]; Figure 4).

3.4.2 | Comparison 2: DBT versus 12 step programmes

Data from one RCT were included in this comparison. We found a different effect for self-reported substance use at medium term (n = 23, SMD = 0.04; 95% CI [−0.78, 0.86]; Figure 5) and for substance use measured by urinalysis (n = 23, SMD = −0.30; 95% CI [−1.12, 0.53]; Figure 6). Also for attrition, we found no significant difference between the groups (n = 12, OR = 15.00; 95% CI [0.70, 319.52]; Figure 7).

3.5 | Other outcomes: Results of individual RCT studies

The secondary outcomes investigated in these studies were symptomatology, examining efficacy of DBT on SUD. (Linehan (1999, 2002)), who compared DBT with TAU and 12-step programmes, found at 16-months post-randomisation an overall reduction of depression (BDI, M = 0.98) and reduction of levels of overall psychopathology as measured by the global assessment scale (GAS, M = 47.4) in both studies; no differences emerged for social adjustment. An RCT study by Courbasson et al. (2012), comparing DBT and TAU from baseline to 12-months follow-up, reported a significant positive effect on negative mood regulation (NMRS, M = 106.4) and depression symptoms (BDI, M = 10.7).

3.6 | Risk of bias across studies

Results of the risk of bias evaluation are presented in Table 2. The use of randomisation was generally adequate. Lack of clarity was relatively common for use of blinding (participation and personnel) and allocation concealment.

4 | DISCUSSION

4.1 | Summary of evidence

This systematic review and meta-analysis examined the effect of DBT on SUD, compared to TAU and 12-step programmes, based on randomised evidence. Although the efficacy of DBT compared to usual treatment or 12-step programmes has been of interest, to our knowledge this is the first comprehensive meta-analytic review restricted to RCTs and focused specifically on DBT and 12-step programmes for SUD. We found some evidence from the included RCTs to support the efficacy of DBT. Comparing DBT and 12-step programmes, we found no differential impact on SUD.

Comparing DBT and TAU, we found a significant differential impact on SUD favouring DBT. DBT was superior to TAU for self-reported substance use in the short and long term (1 RCT, SMD = −0.84; 95% CI [−1.64, −0.04]; 2 RCT, SMD = −1.26; 95% CI [−2.13, −0.40]). We found also a large effect size at medium follow-up, but non-significant, probably due to small size of simple (2 RCTs, SMD = −1.43; 95% CI [−3.38, 0.51]). DBT had less attrition than TAU (2 RCT, OR = 0.12).

There was non-significant difference in substance use measured by urinalysis at all follow-up times (short term: 1 RCT, SMD = −0.42; 95% CI [−1.19, 0.35], medium term: SMD = −0.19; 95% CI [−1.03, 0.65], long term: SMD = −0.44; 95% CI [−1.25, 0.37]). However, DBT was not shown to reduce substance use more than 12-step programmes, as determined by self-report substance use (1 RCT, SMD = 0.04; 95% CI [−0.78, 0.86]), urinalysis (1 RCT, SMD = −0.30; 95% CI [−1.12, 0.53]) and attrition (1 RCT, OR = 15.00) up to 12 months following intervention.

The findings from the present review show evidence that both treatments may be effective for SUD, but that one is not better than the other. Furthermore, these findings are in line with excluded studies that suggested that DBT can be effectively applied with borderline patients with or without SUD comorbidity (Axerold, Perepletchikova, Holtzman, & Rajita, 2011; Dimeff, Rizvi, & Brown, 2000; Kröger et al., 2006; Van Den Bosch, Koeter, Stijnen, Verheul, & Van Den Brink, 2005; Van den Bosch et al., 2002).

Contextual evidence from observational studies not included in this review suggested that several demonstrate that longer duration of AA attendance is associated with less drinking than shorter attendance (Grossop et al., 2003; Laudet et al., 2006; Moos & Moos 2006). Two uncontrolled studies (Moos & Moos, 2006; Timko, Moos, Finney, & Lesar, 2000), not included in previous

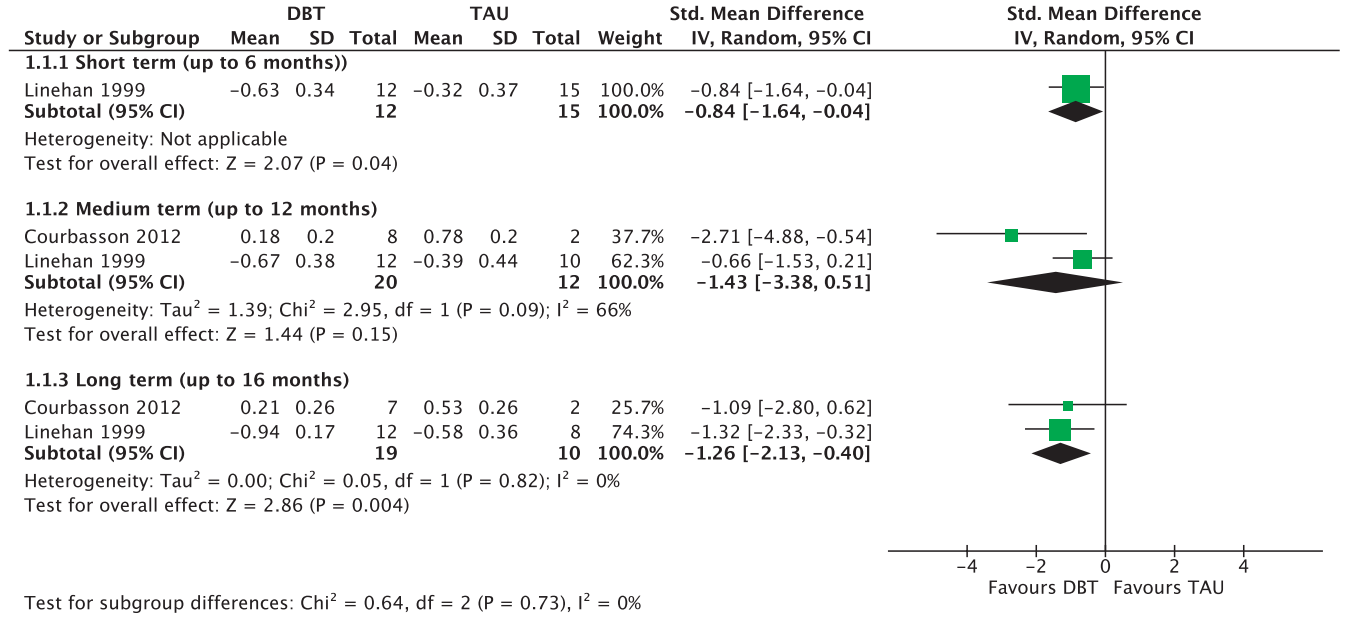

FIGURE 2 Meta-analysis: comparison dialectical behaviour therapy versus treatment as usual, primary outcome—self-reported substance use

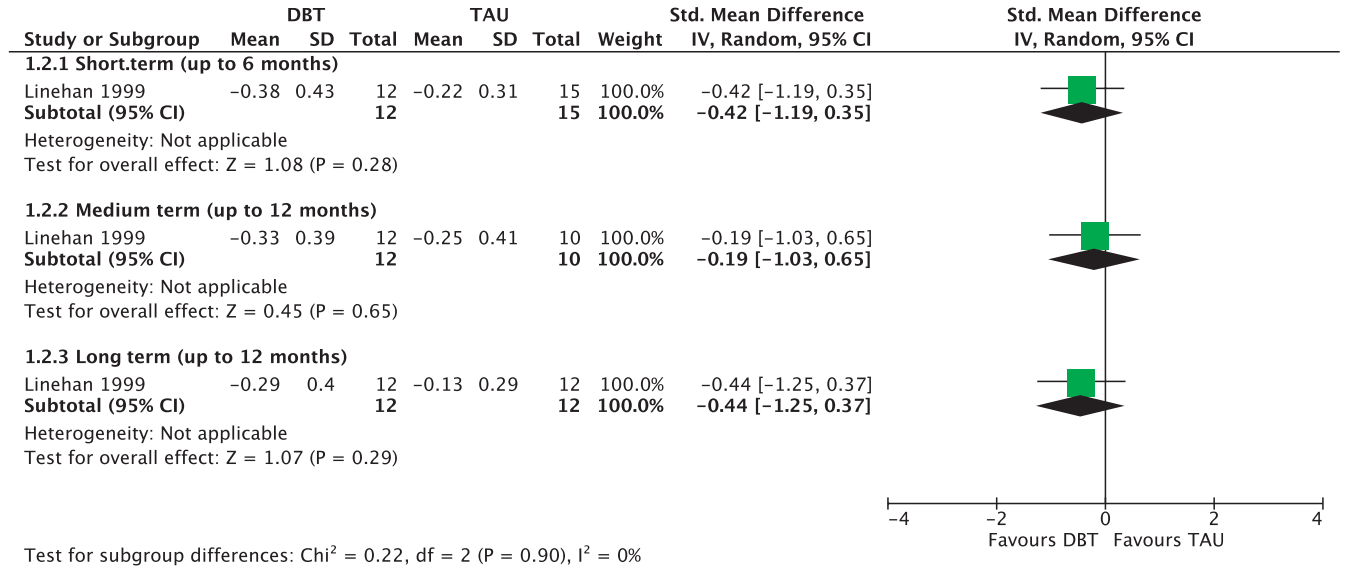

FIGURE 3 Meta-analysis: comparison dialectical behaviour therapy versus treatment as usual, primary outcome—substance use as measured by urinalysis

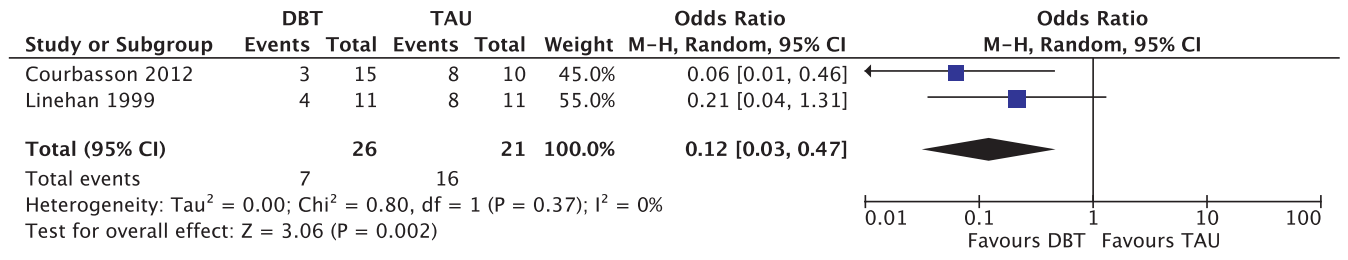

FIGURE 4 Meta-analysis: comparison dialectical behaviour therapy versus treatment as usual, primary outcome—attrition

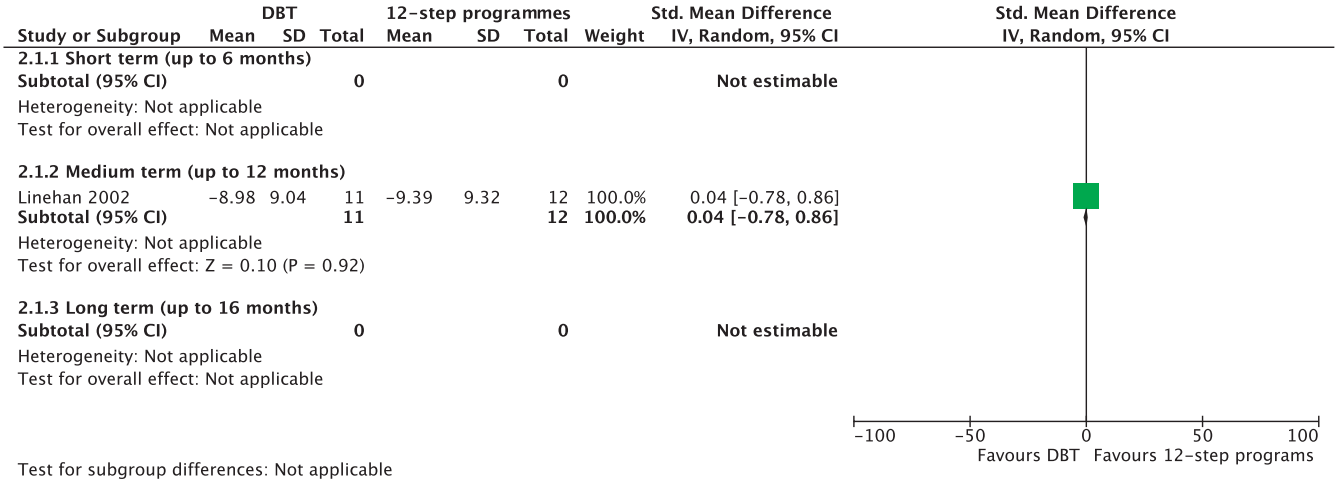

FIGURE 5 Meta-analysis: comparison dialectical behaviour therapy versus 12-step programs, primary outcome—self-reported substance use

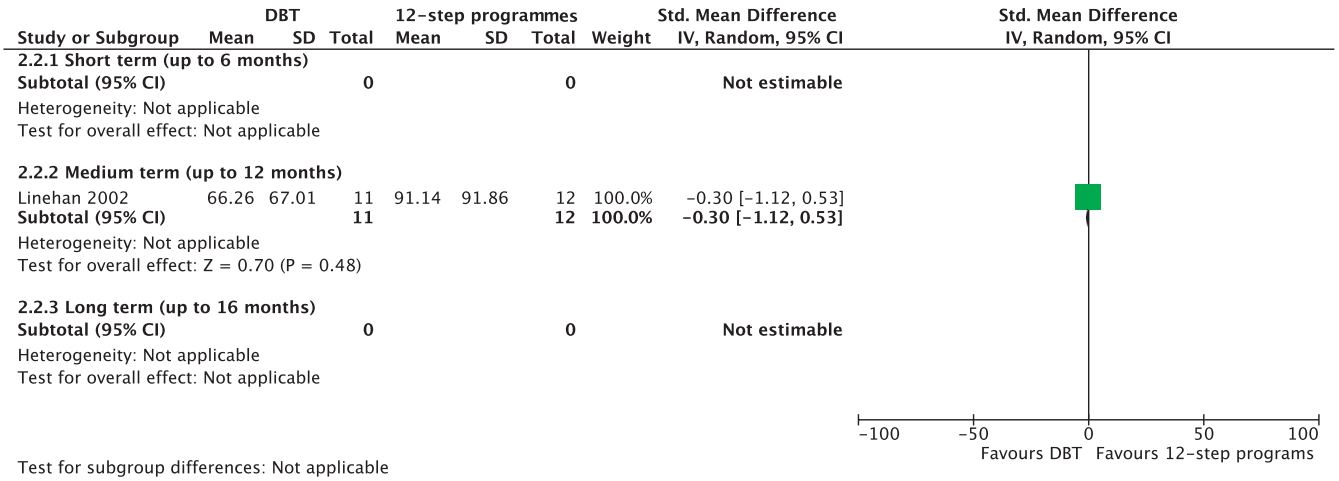

FIGURE 6 Meta-analysis: comparison dialectical behaviour therapy versus 12-step programs, primary outcome—substance use as measured by urinalysis

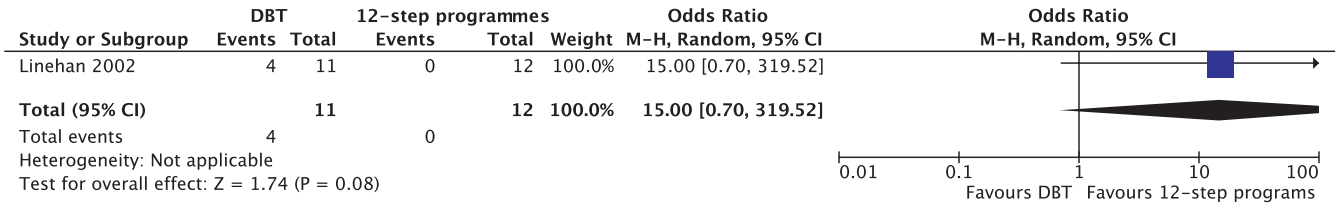

FIGURE 7 Meta-analysis: comparison dialectical behaviour therapy versus 12-step programs, primary outcome—attrition

systematic reviews (Bøg et al., 2017; Ferri et al., 2006; Nielsen et al., 2014), found an overall relationship (positive effect) between 12-step self-help group participation–attendance and positive drinking outcomes. Such outcomes are consistent with conclusions from previous systematic reviews of the effects of 12-step programmes for SUD.

4.2 | Limitations

Several limitations should be taken into consideration while discussing the results of the present meta-analysis. One of the major limitations of this review is the limited number of studies per outcome. We believe that the excluded studies, focusing on effectiveness of DBT

TABLE 2 Risk of bias in included studies

Study	Random sequence generation	Allocation concealment	Blinding of participants and personnel	Blinding of outcomes assessors	Incomplete outcome data addressed	Free of selective reporting
Courbasson 2012	Yes	Unclear	Unclear	Unclear	No	No
Linehan 1999	Yes	Unclear	Unclear	Unclear	Yes	Yes
Linehan 2002	Yes	Unclear	Unclear	Unclear	No	No

Abbreviations: n/a, not applicable; No, high risk of bias; Yes, low risk of bias.

and 12-step programmes for SUD, could be relevant in terms of our outcomes of interest, but such studies failed to meet the rigorous requirements of our PICOS criteria.

Three additional limitations are the limited sample size within the included RCT studies, the fact that all participants in DBT groups were women, and the fact that we did not exclude comorbidity of SUD with BPD. Larger sample sizes within included studies would have allowed for a more thorough examination of treatment effects with greater statistical power. Moreover, since the included DBT studies involved only women participants, the findings can only be generalised to that population. Finally, not excluding comorbidity of SUD with BPD might have generated dishomogeneous samples in the two treatment groups, with a possible impact on the observed relative efficacy of the two treatment forms—this due to the fact that clients with a diagnosis of both SUD and BPD clients would present more severe and entrenched difficulties compared to clients with a diagnosis of only SUD.

It is worth acknowledging a limitation that impacts the availability of RCTs of 12-step programmes. There is an inherent difficulty in randomising participants to 12-step programmes (Ferri et al., 2006). This challenge reduces the availability of rigorously conducted trials of 12-step programmes and may have contributed to the observed lack of RCTs that compare 12-step programmes to DBT.

Our meta-analysis was limited by incomplete data reporting within the included studies. We found incomplete and unclear data for primary and secondary outcomes, and were unable to obtain additional information from authors. These studies did not specify the method used (if any) for statistically addressing missing data.

To surpass the limitations of previous systematic reviews, we undertook comprehensive searching and meta-analysis in accordance with the PRISMA statement. We believe this systematic review contains all relevant studies that have been conducted in this particular area, but it is possible that there are unpublished studies we were not aware of.

4.3 | Implications for future research

The findings of this review have important implications for future research. This review highlighted the need for improved completeness in research reporting and more rigorously designed studies examining the impact of DBT for SUD (Dimeff & Linehan, 2008) using larger sample sizes.

There is a need for research with SUD participations without comorbidity; there is a need for research regarding retention in treatment and severity of mental health symptoms among people with SUD. In addition, more studies are needed that directly compare DBT to 12-step programmes. People considering attending AA or TSF programmes should be made aware that there is a lack of highly controlled experimental evidence on the effectiveness of such programmes, and that although individual studies and less highly controlled studies demonstrate positive effects, further research is needed.

ORCID

Ezechiele Giannelli https://orcid.org/0000-0002-7761-0988

REFERENCES

American Psychiatric Association (2013). *Diagnostic and statistical manual of mental disorders* (5th ed.). Washington, DC: Author.

Axelrod, S. R., Perepletchikova, F., Holtzman, K., & Sinha, R. (2011). Emotion regulation and substance use frequency in women with substance dependence and borderline personality disorder receiving dialectical behavior therapy. *American Journal of Drug and Alcohol Abuse*, *37*(1), 37–42. https://doi.org/10.3109/00952990.2010.535582.

Bøg, M., Filges, T., Brännström, L., Jørgensen, A. M. K., & Fredriksson, M. K. (2017). 12-step programs for reducing illicit drug use. *Campbell Systematic Reviews*, *13*.

Bradley, B. P., Gossop, M., Brewin, C. P., & Phillips, G. (1992). Attributions and relapse in opiate addicts. *Journal of Consulting and Clinical Psychology*, *60*, 470–472.

Carroll, K. M., Nich, C., Ball, S. A., McCance, E., Frankforter, T. L., & Rounsavile, B. J. (1998). Oneyear follow-up of disulfiram and psychotherapy for cocaine alcohol users: sustained effects of treatment. *Addiction*, *95*(9), 1335–1349. https://doi.org/10.1046/j.1360-0443.2000.95913355.x.

Carroll, K. M., Nich, C., Shi, J. M., Eagan, D., & Ball, S. A. (2012). Efficacy of disulfiram and twelve step facilitation in cocaine-dependent individuals maintained on methadone: a randomized placebo-controlled trial. *Drug and Alcohol Dependence*, *126*(1–2), 224–231. https://doi.org/10.1016/j.drugalcdep.2012.05.019.

Courbasson, C., Nishikawa, Y., & Dixon, L. (2012). Outcome of dialectical behaviour therapy for concurrent eating and substance use disorders. *Clinical Psychology and Psychotherapy*, *19*(5), 434–449. https://doi.org/10.1002/cpp.748.

Cummings, C., Gordon, J. R., & Marlatt, G. A. (1980). Relapse: Strategies of prevention and prediction. In W. R. Miller (Ed.), *The addictive behaviors: Treatment of alcoholism, drug abuse, smoking, and obesity* (pp. 291–321). London, UK: Pergamon Press.

Dimeff, L. A., & Koerner, K. (2007). *Dialectical behaviour therapy in clinical practice*. New York, NY: The Guilford Press.

Dimeff, L. A., & Linehan, M. M. (2008). Dialectical behavior therapy for substance abusers. *Addiction Science and Clinical Practice*, *4*(2), 39–47.

Dimeff, L. A., Rizvi, S. L., Brown, M., & Linehan, M. M. (2000). Dialectical behavior therapy for substance abuse: a pilot application to methamphetamine-dependent women with borderline personality disorder. *Cognitive and Behavioral Practice*, *7*(4), 457–468. https://doi.org/10.1016/S1077-7229(00)80057-7.

Ditman, K. S., Crawford, G. G., Forgy, E. W., Moskowitz, H., & Macandrew, C. (1967). A controlled experiment on the use of court probation for drunk arrests. *American Journal of Psychiatry*, *124*, 160–163.

Emrick, C. D., Tonigan, J. S., Montgomery, H., & Little, L. (1993). Alcoholics anonymous: What is currently known? In B. S. McCrady & W. R. Miller (Eds.), *Research on alcoholics anonymous: Opportunities and alternatives* (pp. 41–76). Piscataway, NJ: Rutgers Center of Alcohol Studies.

Ferri, M., Amato, L., & Davoli, M. (2006). Alcoholics anonymous and other 12-step programmes for alcohol dependence. *The Cochrane Collaboration*, *3*, 10–12. https://doi.org/10.1002/14651858.CD005032.

Galanter, M., & Kleber, H. D. (2008). *The American Psychiatric Publishing textbook of substance abuse treatment* (4th ed.). Washington, DC: American Psychiatric Publishing.

Gossop, M., Harris, J., Best, D., Man, L., Manning, V., Marshall, J., & Strang, J. (2003). Is attendance at alcoholics anonymous meetings after inpatient treatment related to improved outcomes? A 6-month follow-up study. *Alcohol and Alcoholism*, *38*(5), 421–426. https://doi.org/10.1093/alcalc/agg104.

Higgins, J. P. T., Altman, D. G., Gøtzsche, P. C., Jüni, P., Moher, D., & Oxman, A. D. (2011). The cochrane collaboration's tool for assessing risk of bias in randomised trials. *BMJ Journal*, *343*, 1–9. https://doi.org/10.1136/bmj.d5928.

International Narcotics Control Board (2013). *Report of the International Narcotics Control Board for 2013*. Retrieved from www.incb.org/documents/Publications/AnnualReports/AR2013/English/AR_2013_E.pdf

Kelly, J. F., & Greene, M. C. (2013). The twelve promises of alcoholics anonymous: Psychometric measure validation and mediational testing as a 12-step specific mechanism of behavior change. *Drug and Alcohol Dependence*, *133*(2), 633–640. https://doi.org/10.1016/j.drugalcdep.2013.08.006.

Khantzian, E. J., & Schneider, R. J. (1986). Treatment implications of a psychodynamic understanding of opioid addicts. In R. E. Meyer (Ed.), *Psychopathology and addictive disorders* (pp. 323–333). New York, NY: The Guilford Press.

Kröger, C., Schweiger, U., Sipos, V., Arnold, R., Kahl, K. G., Schunert, T., & Reinecker, H. (2006). Effectiveness of dialectical behaviour therapy for borderline personality disorder in an inpatient setting. *Behaviour Research and therapy*, *44*(8), 1211–1217. https://doi.org/10.1016/j.brat.2005.08.012.

Kushner, M. G., Sher, K. J., & Beitman, B. D. (1990). The relation between alcohol problems and the anxiety disorders. *American Journal of Psychiatry*, *6*, 685–695. https://doi.org/10.1176/ajp.147.6.685

Laudet, A. B. (2008). The impact of Alcoholics Anonymous on other substance abuse-related twelve-step programs. In *Recent developments in alcoholism* (pp. 71–89). New York, NY: Springer.

Laudet, A., Morgen, K., & White, W. (2006). The role of social supports, spirituality, religiousness, life meaning and affiliation with 12-step fellowships in quality of life satisfaction among individuals in recovery from alcohol and drug problems. *Alcohol Treatment Quarterly*, *24*(1–2), 33–73. https://doi.org/10.1300/J020v24n01_04

Linehan, M. M. (1993). *Cognitive-behavioral treatment of borderline personality disorder*. New York, NY: The Guilford Press.

Linehan, M. M. (2014). *DBT skills training manual*. New York, NY: The Guilford Press.

Linehan, M. M., Dimeff, L. A., Reynolds, S. K., Comtois, K. A., Welch, S. S., Heagerty, P., & Kivlahan, D. R. (2002). Dialectical behavior therapy versus comprehensive validation therapy plus 12-step for the treatment of opioid dependent women meeting criteria for borderline personality disorder. *Drug and Alcohol Dependence*, *67*(1), 13–26. https://doi.org/10.1016/S0376-8716(02)00011-X

Linehan, M. M., Schmidt, H., Dimeff, L., Craft, C., Kanter, J., & Comtois, K. (1999). Dialectic behavior therapy for patients with borderline personality disorder and drug-dependence. *The American Journal on Addiction*, *8*(4), 279–292. https://doi.org/10.1080/10550499305686

MATCH (1997). Matching alcoholism to client heterogeneity: Project MATCH post-treatment drinking outcomes. *Journal of Studies on Alcohol and Drugs*, *58*(1), 7–29.

Maude-Griffin, P. M., Hohenstein, J. M., Humfleet, G. L., Reilly, P. M., Tusel, D. J., & Hall, S. M. (1998). Superior efficacy of cognitive-behavioral therapy for urban crack cocaine abusers: Main and matching effects. *Journal of Consulting and Clinical Psychology*, *66*(5), 832–837. https://doi.org/10.1037/0022-006x.66.5.832.

McCrady, B. S. (1994). Alcoholics Anonymous and behavior therapy: Can habits be treated as diseases? Can diseases be treated as habits? *Journal of Consulting and Clinical Psychology*, *62*, 1159–1166.

McKellar, J., Stewart, E., & Humphreys, K. (2003). Alcoholics anonymous involvement and positive alcohol-related outcomes: cause, consequence, or just a correlate? A prospective 2-year study of 2,319 alcohol-dependent men. *Journal of Consulting and Clinical Psychology*, *71*(2), 302–308. https://doi.org/10.1037/0022-006X.71.2.302.

Moher, D., Liberati, A., Tetzlaff, J., & Altman, D. G. (2009). Preferred reporting items for systematic reviews and meta-analyses: The PRISMA statement. *PLoS Med*, *6*(7).https://doi.org/10.1371/journal.pmed.1000097

Montgomery, H., Miller, W. R., & Tonigan, J. S. (1995). Does alcoholics anonymous involvement predict treatment outcome? *Journal of Substance Abuse Treatment*, *12*(4), 241–246. https://doi.org/10.1016/0740-5472(95)00018-Z

Moos, R. H., & Moos, B. S. (2006). Participation in treatment and alcoholics anonymous: a 16-year follow-up of initially untreated individuals. *Journal of Clinical Psychology*, *62*(6), 735–750. https://doi.org/10.1002/jclp.20259

Moos, R. H., & Timko, C. (2008). Outcome research on 12-Step and other self-help programs. In M. Galanter, & H. D. Kleber (Eds.), *The American psychiatric publishing textbook of substance abuse treatment* (pp. 572–618). Washington: American Psychiatric Publishing.

Morgenstern, J., Labouvie, E., Mccrady, B. S., Kahler, C. W., & Prey, R. M. (1997). Affiliation with alcoholics anonymous after treatment: A study of its therapeutic effects and mechanisms of action. *Journal of Consulting and Clinical Psychology*, *65*(5), 768–777. https://doi.org/10.1037/0022-006X.65.5.768.

Narcotics Anonymous (2008). *Narcotics anonymous – Basic text* (6th ed.). Chatsworth, CA: Narcotics Anonymous World Services.

Neacsiu, A. D., Rizvi, S. L., & Linehan, M. M. (2010). Dialectical behavior therapy skills use as a mediator and outcome of treatment for borderline personality disorder. *Behaviour Research and Therapy*, *48*(9), 832–839.

Nielsen, S. K., Filges, T., & Jørgensen, A. M. K. (2014). 12-Step programs to reduce illicit drug use. *International Journal of Criminology and Sociology*, *3*, 100. https://doi.org/10.6000/1929-4409.2014.03.08.

Timko, C., Moos, R. H., Finney, J. W., & Lesar, M. D. (2000). Long-term outcomes of alcohol use disorders: comparing untreated individuals with those in alcoholics anonymous and formal treatment. *Journal of Studies on Alcohol*, *61*(4), 529–540.

Tonigan, J. S., & Connors, G. J. (2008). Psychological mechanisms in alcoholics anonymous. In M. Galanter, & H. D. Kleber (Eds.), *The American psychiatric publishing textbook of substance abuse treatment* (pp. 491–498). Washington, DC: American Psychiatric Publishing.

Tonigan, J. S., Rynes, K. N., & McCrady, B. S. (2013). Spirituality as change mechanism in 12-step programs: A replication, extension,

and refinement. *Substance Use and Misuse*, *48*(12), 1161–1173. https://doi.org/10.3109/10826084.2013.808540.

Tonigan, J. S., Toscova, R., & Miller, W. R. (1996). Meta-analysis of the literature on alcoholics anonymous: Sample and study characteristics moderate findings. *Journal of Studies on Alcohol*, *57*(1), 65–72. https://doi.org/10.15288/jsa.1996.57.65.

Van den Bosch, L. M., Koeter, M. W., Stijnen, T., Verheul, R., & van den Brink, W. (2005). Sustained efficacy of dialectical behaviour therapy for borderline personality disorder. *Behaviour Research and Therapy*, *43*(9), 1231–1241. https://doi.org/10.1016/j.brat.2004.09.008

Van den Bosch, L. M., Verheul, R., Schippers, G. M., & van den Brink, W. (2002). Dialectical behavior therapy of borderline patients with and without substance use problems: implementation and long-term effects. *Addictive Behaviors*, *27*(6), 911–923.

WHO (2014). *Global status report on alcohol and health. 2014 edition*. Geneva, Switzerland: WHO.

Wilson, B. (1939). Alcoholics anonymous. *New York State Journal of Medicine*, 50–51.

World Health Organization (1994). *Lexicon of alcohol and drug terms*. Geneva, Switzerland: WHO.

SUPPORTING INFORMATION

Additional supporting information may be found online in the Supporting Information section at the end of the article.

How to cite this article: Giannelli E, Gold C, Bieleninik L, Ghetti C, Gelo OCG. Dialectical behaviour therapy and 12-step programmes for substance use disorder: A systematic review and meta-analysis. *Couns Psychother Res*. 2019;00:1–12. https://doi.org/10.1002/capr.12228

BIOGRAPHIES

Ezechiele Giannelli, Ph.D. in Human and Social Sciences at the Department of History, Society and Human Studies, University of Salento, Italy, is a psychologist and cognitive-behavioral psychotherapist. His scientific interests include: (a) substance use disorder (b) personality disorders (c) quantitative research methods. As psychotherapist, he works in private and public mental health services with adults with personality disorder (especially cluster B), with substance use disorders, and with dual diagnosis.

Christian Gold, PhD, is Principal Researcher at GAMUT, NORCE Norwegian Research Centre, Bergen, Norway. He is also Adjunct Professor at the University of Bergen and at Aalborg University, Denmark. He serves as Editor of the Cochrane Developmental, Psychosocial and Learning Problems Group. His research includes randomised trials and systematic reviews of psychosocial therapies in mental health, as well as process-outcome research and reviews of research methodology. His work has been cited more than 5000 times according to Google Scholar, with an h-index of 34. He has over 60 international peer-reviewed publications (over 270 publications in total) and as PI has managed research grants totalling over 5M€.

Lucja Bieleninik, PhD, is Assistant Professor of Psychology in Clinical Psychology and Neuropsychology Department at the University of Gdańsk (Poland) and senior researcher at GAMUT–The Grieg Academy Music Therapy Research Centre, NORCE Norwegian Research Centre AS (Norway). Her scientific interests focus on quantitative and mixed-methods research on the effectiveness of non-pharmacological intervention in mental health. Her research considers the whole family system, especially in context of the premature birth and the long-lasting sequelae of prematurity.

Claire M. Ghetti, Ph.D. is Associate Professor of Music Therapy at the Grieg Academy, University of Bergen, Norway, and a senior researcher with the Grieg Academy Music Therapy Research Centre. As a music therapist, she has worked extensively with adults with HIV/AIDS and substance use problems, and children and adults in intensive and long-term care medical settings. Her research interests include: (a) music therapy within a harm reduction paradigm, (b) systematic review of complex interventions in substance use treatment, (c) client perspectives in substance use treatment, and (d) epistemology and methodology of music therapy research.

Omar C. G. Gelo, is Associate Professor of Dynamic Psychology and director of the Bachelor and Master Program in Psychology at the Department of History, Society and Human Studies, University of Salento, Italy. He is also former director of the English Ph.D. Program in Psychotherapy Science at the Sigmund Freud University, Vienna, Austria). His research interests concern: (a) the epistemology of psychotherapy and of psychological intervention; (b) the epistemology and methodology of psychotherapy research methods (quantitative, qualitative, mixed); (c) the empirical investigation of psychotherapeutic change process; (d) the application of dynamic systems theory and infant research to psychotherapy research; (e) the empirical investigation of psychotherapy trainees‘ development.