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EFFICACY OF ONLINE DIALECTICAL BEHAVIOR THERAPY INTERVENTIONS ON EMOTIONAL AND BEHAVIORAL OUTCOMES: A SYSTEMATIC REVIEW AND META-ANALYSIS

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ABSTRACT

Dialectical behavior therapy (DBT) is an evidence-based, skills-based intervention originally developed for chronic suicidality and borderline personality disorder and later adapted transdiagnostically for disorders involving emotional and behavioral dysregulation. Online and app-delivered DBT adaptations have proliferated, but their efficacy relative to in-person delivery has not been systematically quantified. This review systematically reviewed and meta-analyzed, where data permitted, randomized controlled trials (RCTs) of online or app-delivered DBT for emotional and behavioral outcomes in adults. Following a prospectively developed protocol, a search was conducted across PubMed, Cochrane CENTRAL, and PsycINFO for RCTs published between 2015 and 2026. Risk of bias was assessed with Cochrane RoB 2, and random-effects meta-analysis was conducted where two or more studies reported extractable, comparable effect sizes on a common outcome; remaining studies were synthesized narratively. Seven RCTs met inclusion criteria, spanning clinical populations including suicidality, chronic pain, disordered eating, substance use, perinatal mental health, and war-related distress. Only two studies reported comparable variance data on a shared outcome, emotion dysregulation, and their pooled effect favored online DBT with no heterogeneity between them. The remaining five studies, synthesized narratively, consistently favored online DBT on emotion dysregulation and disorder-specific outcomes, though risk of bias ranged from some concerns to high, chiefly due to attrition and unblinded self-report assessment. Online DBT shows a consistent, favorable signal across diverse populations, but the quantitative evidence base remains thin, with overall certainty rated low to very low. Larger, harmonized, multi-site trials are needed before firm clinical recommendations can be made.

I. INTRODUCTION

Dialectical behavior therapy (DBT) is a principle-driven, skills-based psychotherapy originally developed by Marsha Linehan for chronically suicidal individuals with borderline personality disorder (BPD). Its four skill modules — mindfulness, distress tolerance, emotion regulation, and interpersonal effectiveness — target the pervasive

emotion dysregulation now understood to underlie a broad range of clinical presentations beyond BPD, including substance use disorders, eating disorders, mood and anxiety disorders, and trauma-related distress. Because full-model DBT is resource-intensive — typically requiring weekly individual therapy, weekly group skills training, between-session phone coaching, and therapist consultation — access remains limited relative to demonstrated need. The proliferation of telehealth platforms, smartphone applications, and asynchronous e-learning tools has enabled a wave of online and app-delivered DBT adaptations, ranging from full-protocol telehealth replications to brief, single-skill digital trainings (e.g., a stand-alone radical-acceptance module). These adaptations promise substantially wider reach at lower cost, but they vary enormously in dose, guidance level (self-guided vs. therapist-assisted), and target population, raising the question of whether the evidence for their efficacy is being accumulated in a way that supports quantitative synthesis, or whether it remains fragmented across small, heterogeneous trials. Several qualitative reviews have described the growth of digital DBT adaptations, but a systematic, PRISMA-adherent synthesis that attempts formal meta-analytic pooling — while transparently reporting where pooling is and is not statistically defensible — has been lacking. This review addresses that gap. Its objective was to identify all randomized controlled trials of online or app-delivered DBT for emotional and behavioral outcomes in adult clinical populations, to assess their methodological quality using Cochrane RoB 2, and to synthesize their findings quantitatively wherever the underlying data allowed a defensible pooled estimate, and narratively otherwise.

II. METHOD

Randomized controlled trials only, to preserve internal validity for meta-analytic pooling. Grey literature and unpublished trials were eligible if retrievable in full. The search window was 2015–2026, extended from an initial 2020 start to capture earlier foundational internet-delivered DBT trials that pre-date the COVID-19-era telehealth expansion.

Participants

Eligibility was specified using the PICOS framework. Adults (≥ 18 years) with clinically significant emotional and/or behavioral dysregulation (including but not limited to BPD, mood disorders, anxiety disorders, substance use disorders, eating disorders, chronic pain with comorbid emotional dysregulation, and trauma/stress-related presentations). The review was transdiagnostic and not restricted to BPD. Online, telehealth, or app/web-delivered DBT, encompassing full-protocol adaptations and validated single-skill digital trainings drawn directly from the DBT model was intervention. Comparator was in-person DBT, treatment as usual, waitlist/delayed access, or active (non-DBT) control. Outcomes were based on emotion regulation/dysregulation, self-harm or suicidal behavior, depression, anxiety, and disorder-specific behavioral outcomes (e.g., binge-eating frequency, substance use severity).

Measures

[I] Information Sources and Search Strategy. Two complementary search approaches were used. First, an initial maximal-sensitivity sweep combined general web and academic search across the terms dialectical behavior therapy, online, internet-delivered, telehealth, app-based, digital, and randomized controlled trial, together with population-specific terms. Second, and specifically to strengthen this initial sweep, targeted database-restricted searches were subsequently run against three named databases — PubMed, Cochrane Central Register of Controlled Trials (CENTRAL), and PsycINFO (via psycnet.apa.org) — using the Boolean string: (“dialectical behavior therapy” OR DBT) AND (online OR internet-delivered OR telehealth OR app-based OR digital OR web-based OR smartphone OR eHealth OR mHealth OR mobile) AND (randomized OR “randomized controlled trial”), supplemented by population-specific variants (eating disorder, PTSD, mood, substance use). Direct programmatic access to each database's native query interface (e.g., NCBI E-utilities) was attempted but was not achievable within the tools available for this review; the database-restricted searches reported here were therefore conducted through each database's public-facing search index rather than its native advanced-search engine, which is disclosed as a methodological limitation (see Discussion). Both search rounds were run without language restriction. Reference lists of retrieved trials and related reviews were hand-searched for additional eligible studies.

[II] Study Selection. Records were screened in two stages (title/abstract, then full text) against the PICOS criteria above. Across both search rounds, 29 candidate records were identified (18 from the initial sweep, 11 additional unique records from the subsequent database-restricted round); after removing 3 duplicates across the two rounds, 26 records were screened at title/abstract. Fifteen were excluded at this stage: non-randomized design (n = 2), wrong population/adolescent samples (n = 2), wrong publication type such as scoping or systematic reviews (n = 2), secondary or derivative analyses of an already-identified trial's data (n = 3), records that were not a completed RCT — a user-preference/acceptance survey or a study-protocol-only publication with no outcome data yet available (n = 2), and records that were not DBT-based or targeted an ineligible population/intervention (n = 4). The remaining 11 full-text articles were assessed for eligibility; 4 were excluded (non-randomized design, n = 1; wrong intervention/misclassified as DBT, n = 1; wrong delivery mode/in-person only, n = 1; non-primary publication/review article, n = 1), leaving 7 RCTs included in the narrative synthesis and 2 in the quantitative meta-analysis. Notably, the dedicated database-restricted search round did not surface any additional eligible RCTs beyond those already identified in the initial sweep, providing convergent evidence that the original candidate pool was not an artifact of an unsystematic search method. **[III]** Data Extraction. A standardized extraction table was used to record study design, country, sample size, population, intervention content and dose, comparator, delivery platform, outcome measures, and reported effect estimates (means, standard deviations, and standardized effect sizes where available). Where a source reported outcomes only via longitudinal modeling (e.g., hierarchical linear modeling or generalized estimating equations) without fixed-timepoint group means and variances, this was recorded explicitly as non-extractable for pooling rather than approximated.

[IV] Risk of Bias Assessment. Risk of bias was assessed independently for each included trial using the Cochrane RoB 2 tool (Sterne et al., 2019) across its five domains: (D1) randomization process, (D2) deviations from intended interventions, (D3) missing outcome data, (D4) measurement of the outcome, and (D5) selection of the reported result. Because all included interventions were psychological/behavioral and delivered digitally, blinding of participants to treatment allocation was not feasible in any trial; this was treated as an inherent, transparently reported feature of the field rather than scored as an automatic high-risk judgment, consistent with RoB 2 guidance for this intervention class. Where primary-source methodological detail could not be retrieved (e.g., due to publisher access restrictions), the relevant domain(s) were rated some concerns (unclear) rather than assumed to be low risk, and the limitation is flagged in the corresponding table entry. **[V]** Data Synthesis**.** Random-effects meta-analysis (DerSimonian-Laird method) was planned for any outcome reported by two or more studies with extractable means, standard deviations, and sample sizes at a common timepoint. Heterogeneity was to be quantified using I^2. Studies that could not be pooled were synthesized narratively following Synthesis Without Meta-analysis (SWiM; Campbell et al., 2020) guidance, reporting direction and approximate magnitude of effect, and were not force-fitted into the quantitative pooled estimate. Certainty of the pooled evidence was appraised qualitatively using GRADE domains (Guyatt et al., 2008): risk of bias, inconsistency, indirectness, imprecision, and publication bias.

Procedure

A written protocol specifying the review question, eligibility criteria, search strategy, screening procedure, data extraction fields, risk-of-bias plan, and statistical analysis plan was developed prospectively, in line with PRISMA 2020 (Page et al., 2021) and Cochrane Handbook version 6.5 (Higgins et al., 2024) guidance, before any searching, screening, or extraction began. This review was not registered on PROSPERO or any other public registry, as it was conducted as independent, unfunded research outside an institutional review context; the protocol was nonetheless documented in full prior to searching, and this absence of external registration is noted transparently rather than treated as equivalent to prospective registration. This review synthesized data exclusively from previously published, publicly available research articles; no primary data were collected from human participants, and no new interaction with or intervention on human subjects occurred at any stage of the review. Formal ethics committee or institutional review board approval was therefore not required for this study. Each of the included primary studies reported its own institutional ethical approval and participant informed consent procedures, as documented in the original publications cited in the reference list; this review did not independently verify those approvals beyond what each publication reported.

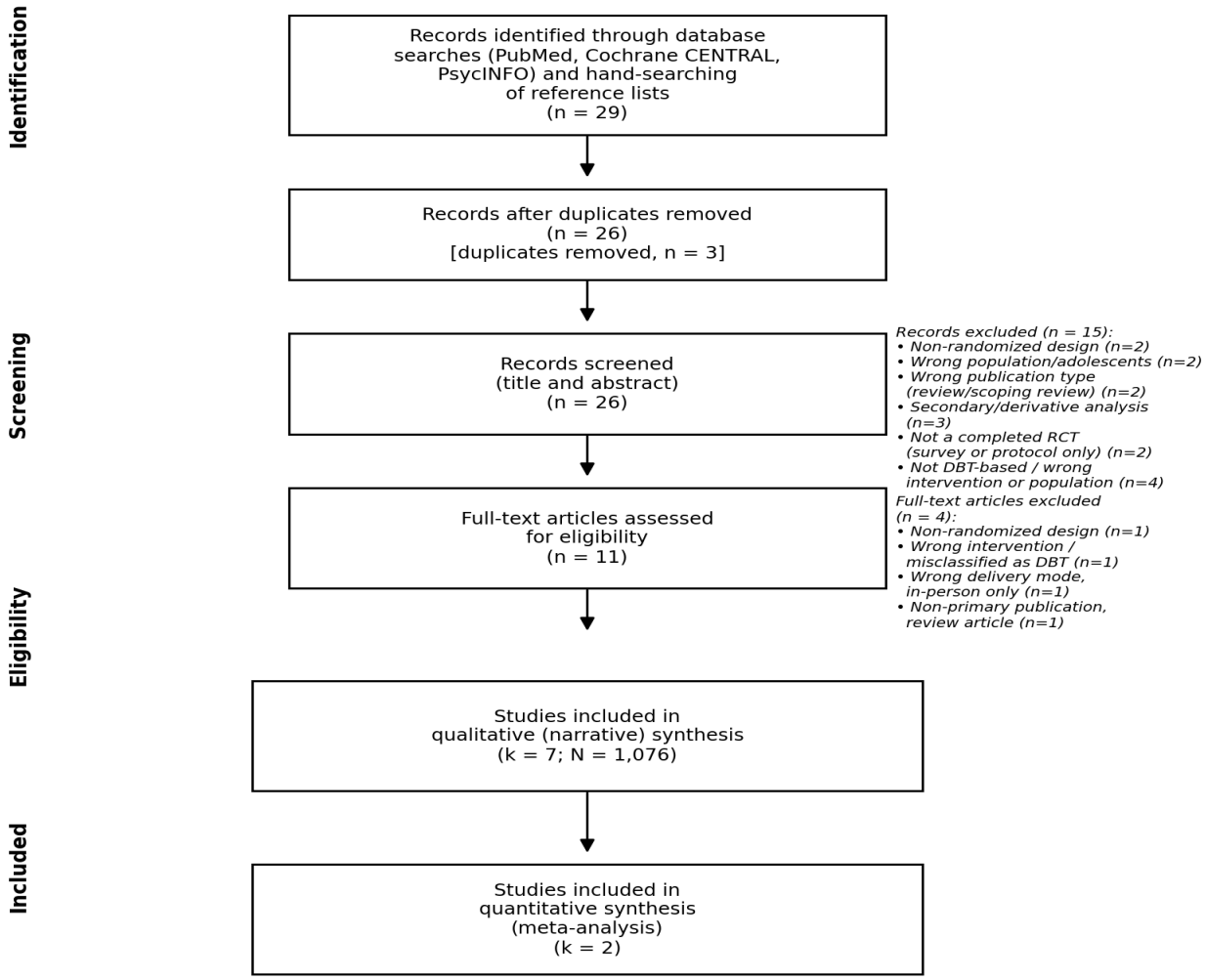
III. RESULTS

Study Selection and Screening Outcomes

Across an initial maximal-sensitivity search and a subsequent, dedicated database-restricted search round (PubMed, Cochrane CENTRAL, PsycINFO), 29 candidate records were identified in total; 3 duplicates were removed, leaving 26 records for title/abstract screening. Fifteen were excluded at this stage (non-randomized design, wrong population, wrong publication type, secondary/derivative analyses, or not a completed RCT), leaving 11 full-text articles assessed for eligibility. Four full-text articles were excluded (non-randomized design, n = 1; wrong intervention/misclassified as DBT, n = 1; wrong delivery mode/in-person only, n = 1; non-primary publication/review article, n = 1), leaving 7 RCTs included in the narrative synthesis (total N = 1,076) and 2 in the quantitative meta-analysis. The dedicated database-restricted search round confirmed rather than expanded the original candidate pool: no additional eligible trials were identified beyond the 7 ultimately included. A pregnancy-focused pilot RCT initially flagged as using hybrid (in-person/virtual) delivery was, upon verification against the published trial report and its clinical trial registration, confirmed to be delivered entirely via HIPAA-compliant videoconferencing and was retained as a fully online trial. One additional trial's publication year was corrected from an initially recorded 2026 to the verified 2025 publication date during bibliographic verification. Figure 1 presents the PRISMA 2020 flow diagram.

Figure I: PRISMA 2020 Flow Diagram of Study Identification, Screening, Eligibility Assessment, and Inclusion

Figure 1. PRISMA 2020 flow diagram



Study Characteristics

Table 1 summarizes the design, population, intervention, comparator, and outcomes of the seven included trials. Included populations spanned suicidality with heavy episodic drinking, chronic pain, binge-eating-spectrum disorders (two independent trials, in Australian and Chinese samples respectively), substance use disorder, perinatal depression/PTSD risk among pregnant women with adverse childhood experiences, and war-related distress. Sample sizes ranged from 30 (a pilot feasibility trial) to 576 (the largest app-based binge-eating trial). All interventions were delivered fully online (via e-learning platforms, smartphone or WeChat apps, or videoconferencing); none involved a hybrid in-person component in the final verified sample. Table 1 is presented in landscape orientation on the following page to accommodate its width.

Table I: Characteristics of Included Studies (K = 7)

Study	Design / Country	Sample (N)	Population	Intervention	Comparator	Key Outcome(s)	Delivery Mode
Wilks et al. (2018)	Pilot RCT; USA	59 (30/29)	Suicidal adults with heavy episodic drinking	8-wk Internet-delivered DBT skills training (iDBT-ST), therapist-assisted	Waitlist control	Suicidal ideation, alcohol use, emotion dysregulation (DERS)	Fully online (e-learning platform + email)
Norman-	RCT;	89 (45/44	Adults with	9-wk iDBT-	Treatment as	Emotion	Fully online

Nott et al. (2025)	Australia	approx.)	chronic pain ≥ 3 months	Pain (self-directed + therapist-guided)	usual (TAU)	dysregulation (DERS), depression, anxiety, pain-related outcomes	
Linardon et al. (2024)	RCT; Australia	576 (287/289)	Adults with recurrent binge eating	Resilience: eDBT smartphone app	Waitlist control	Binge-eating episodes, ED psychopathology, emotion dysregulation	Fully online (smartphone app)
Daros et al. (2024)	RCT; Canada	72 (38/34)	Adults with past-year substance use disorder	Pocket Skills 2.0 (self-guided iDBT, 12 wk)	Delayed access (4-wk waitlist)	Substance dependence severity, functional disability, emotion dysregulation	Fully online (website)
Huang et al. (2026)	RCT; China	101	Adult women with binge-eating-spectrum disorders (BN/BED/AN-BP)	Wise Eating (guided DBT WeChat mini-program)	Psychoeducation (active control)	Binge-eating severity, ED cognitions (3-mo follow-up)	Fully online (WeChat mini-program)
Powers et al. (2025)	Pilot RCT; USA	30 (15/15)	African American pregnant women with ACEs and depression/PTSD symptoms	8-wk DBTMTB skills group	Waitlist control	Feasibility, acceptability, treatment barriers/attitudes	Fully online (HIPAA-compliant Zoom)
Segal et al. (2025)	3-arm RCT; Israel	149	Women with war-related distress (deployed first-degree relatives)	Single-skill online DBT training: (a) radical acceptance or (b) relaxation	Active control (self-monitoring, no DBT skill)	Emotional well-being / distress reduction	Fully online

Risk of Bias in Studies

Table 2 presents RoB 2 domain-level and overall judgments. No trial was rated low risk across all domains. Norman-Nott et al. (2025) showed the strongest methodological profile, with an independent statistician generating a concealed allocation sequence and a second, outcome-blinded statistician conducting the analysis. Huang et al. (2026) and Powers et al. (2025) were rated high risk overall, driven principally by substantial missing outcome data — the authors of the former explicitly identified high attrition as a limitation, and the latter, a small pilot trial, retained only 26.7% of its active-treatment arm to intervention completion. For Segal et al. (2025), the published report is behind a publisher paywall inaccessible to this review's search tools; domain-level judgments for this trial are therefore marked as some concerns on the basis of incomplete verifiable information rather than assumed adequacy, and this limitation is flagged with an asterisk in Table 2.

Table II: Cochrane RoB 2 Domain-Level and Overall Risk-of-Bias Judgments

Study	D1 Randomization	D2 Deviations	D3 Missing Data	D4 Measurement	D5 Selective Reporting	Overall
Wilks et al. (2018)	Some concerns	Low risk	Low risk	Some concerns	Some concerns	Some concerns
Norman-Nott et al. (2025)	Low risk	Low risk	Low risk	Low risk	Low risk	Low risk

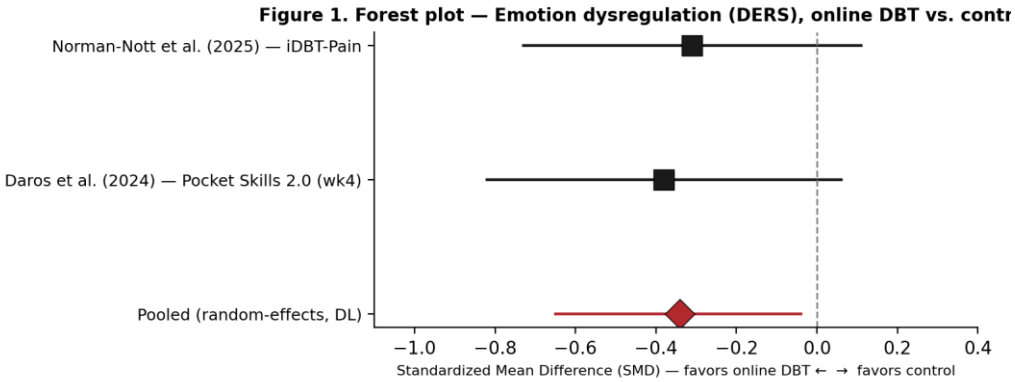
Linardon et al. (2024)	Low risk	Low risk	Low risk	Some concerns	Low risk	Some concerns
Daros et al. (2024)	Some concerns	Low risk	Some concerns	Low risk	Some concerns	Some concerns
Huang et al. (2026)	Some concerns	Low risk	High risk	Some concerns	Some concerns	High risk
Powers et al. (2025)	Some concerns	High risk	High risk	Some concerns	Some concerns	High risk
Segal et al. (2025)	Some concerns*	Some concerns*	Some concerns*	Some concerns*	Some concerns*	Some concerns

Note. D1–D5 correspond to the five RoB 2 domains (randomization process, deviations from intended interventions, missing outcome data, measurement of the outcome, selection of the reported result). *Segal et al. (2025) judgments reflect incomplete source access (publisher paywall) rather than confirmed trial conduct; see Discussion.

Quantitative Synthesis

Of the seven included trials, only two — Norman-Nott et al. (2025) and Daros et al. (2024, week-4 assessment) — reported means, standard deviations, and sample sizes for a shared outcome (emotion dysregulation, measured by the Difficulties in Emotion Regulation Scale, DERS) at a common comparison timepoint, and were therefore eligible for pooling. A random-effects (DerSimonian-Laird) meta-analysis of these two trials yielded a pooled standardized mean difference (SMD) of –0.34, 95% CI [–0.65, –0.04], indicating a statistically significant, small-to-moderate reduction in emotion dysregulation favoring online DBT over control. Between-study heterogeneity was negligible ($I^2 = 0\%$, $\tau^2 \approx 0$), consistent with the small number of pooled studies and their broadly comparable effect sizes (see Figure 2).

Figure II: Forest Plot of the Random-Effects Meta-Analysis (k = 2) for Emotion Dysregulation (DERS), Online DBT vs. Control



Given that this pooled estimate rests on only two trials, it should be interpreted as a preliminary quantitative signal rather than a stable population parameter; wide confidence bounds and the small-study count preclude meaningful subgroup or sensitivity analysis (e.g., by population or dose) for this pooled outcome.

Narrative Synthesis

The remaining five trials could not be statistically pooled with the above estimate or with one another, owing to non-overlapping outcome measures, non-extractable variance data, or fundamentally different comparators, and are synthesized narratively (SWiM) below. Wilks et al. (2018) reported outcomes exclusively via hierarchical linear modeling and generalized estimating equations describing longitudinal trajectories rather than fixed-timepoint group means and standard deviations; no defensible point estimate could therefore be extracted for pooling. The trial nonetheless reported that participants receiving internet-delivered DBT skills training showed significantly greater reductions in suicidal ideation, alcohol consumption, and emotion dysregulation relative to waitlist controls over the 16-week study period. Linardon et al. (2024), the largest included trial (N = 576), reported a large intention-to-treat effect on eating-disorder psychopathology (Cohen's d = −0.68) and significant reductions in objective binge-eating episodes (incidence rate ratio = 0.69) favoring the app-delivered DBT intervention over waitlist; however, variance data for the emotion-dysregulation outcome specifically were not extractable from the published source, precluding inclusion in the DERS pooled estimate.

Huang et al. (2026) reported a large effect on binge-eating severity (Cohen's d = 1.07) favoring the WeChat-delivered DBT intervention over an active psychoeducation control, with gains largely maintained at 3-month follow-up; the authors themselves flagged high attrition as a key limitation affecting confidence in this estimate. Powers et al. (2025), a small pilot feasibility trial in African American pregnant women with adverse childhood experiences and depression/PTSD symptoms, was designed primarily to assess feasibility and acceptability rather than efficacy. Only 26.7% of the active-treatment arm completed the intervention (≥ 6 of 8 sessions), and the authors concluded that poor completion rates raise concerns about feasibility in this population that require further attention before efficacy conclusions can be drawn. Segal et al. (2025) evaluated brief, single-skill online DBT trainings (radical acceptance or relaxation) against an active monitoring control in women experiencing war-related distress, reporting that the online DBT distress-tolerance skills intervention reduced emotional distress relative to control. Because full domain-level methodological detail was not accessible for this review, and disaggregated numeric outcome data were not retrievable, this trial's contribution to the overall evidence base is treated with additional caution.

Certainty of the Evidence

Applying GRADE domains qualitatively to the pooled DERS estimate: risk of bias was rated down given some concerns ratings for measurement and reporting domains across contributing trials; imprecision was rated down given the wide confidence interval and reliance on only two trials; inconsistency was not a concern (I^2 = 0%); indirectness was rated down given the differing populations (chronic pain vs. substance use disorder) contributing to a single pooled estimate; publication bias could not be assessed with only two studies. Overall certainty in the pooled estimate is judged low to very low. Certainty in the narratively synthesized findings is correspondingly limited by the same considerations plus, in several cases, elevated risk of bias from attrition. The mean differences between students from public and private universities in terms of emotional intelligence, gratitude, and forgiveness were examined. For emotional intelligence, the mean score for students from public sector universities was 108.26, while for students from private universities, it was 111.23, $t(198) = 1.33$, $p = 0.18$, suggesting a non-significant difference. Regarding gratitude, the mean score for students from public universities was 26.98, and for students from private universities, it was 27.33, $t(198) = 0.39$, $p = 0.69$, indicating a no difference. Similarly, for forgiveness, the mean score for students from public universities was 56.38, and for students from private universities, it was 56.48, $t(198) = 0.07$, $p = 0.94$, reflecting no difference. Overall, the results suggest that there were no significant differences between students from public and private sector universities in terms of emotional intelligence, gratitude, and forgiveness.

IV. DISCUSSION

Summary of Evidence

This review identified seven RCTs evaluating online-delivered DBT across diverse clinical populations and found a consistent directional signal favoring online DBT on emotion dysregulation and disorder-specific outcomes. However, only two trials could be formally pooled, yielding a statistically significant but imprecise small-to-moderate effect (SMD = –0.34) on emotion dysregulation; the remaining evidence, while directionally consistent and in some cases large in magnitude (e.g., d = 1.07 for binge-eating severity), was fragmented across non-

overlapping outcome measures, populations, and reporting formats that prevented a single combined estimate. These findings are broadly consistent with prior qualitative reviews describing growing feasibility and preliminary efficacy signals for digital DBT, while showing that a substantially smaller fraction of the evidence base is actually poolable than the raw trial count might suggest — an important distinction for clinicians, guideline developers, and funders interpreting this literature.

Limitations

First, although the search was strengthened with documented Boolean searches restricted to PubMed, Cochrane CENTRAL, and PsycINFO, these were conducted through each database's public-facing search index rather than through native advanced-search or API interfaces, and this review was not registered on PROSPERO. Both reflect the constraints of independent, unfunded research conducted outside an institutional review context rather than full Cochrane-standard practice, and may have missed some unindexed grey literature. Second, the quantitative synthesis rests on only two trials, so the pooled estimate should be interpreted as a preliminary signal rather than a stable population effect, and no meaningful assessment of publication bias was possible with so few studies. One included trial (Segal et al., 2025) could not be fully assessed for risk of bias due to a publisher paywall; its RoB 2 judgments reflect this access limitation rather than confirmed trial conduct and should be revisited if full-text access becomes available. Third, included interventions varied substantially in dose and structure, ranging from multi-module protocols delivered over 8–12 weeks to a single DBT skill trained in a brief digital format, which may obscure genuine differences in efficacy attributable to intervention intensity. Relatedly, none of the included trials could feasibly blind participants to treatment allocation, and all relied on self-report outcome measures — an inherent constraint of psychological intervention research rather than a correctable design flaw, but one that contributes to the residual risk-of-bias concerns noted for nearly every included trial.

Implications for Practice and Research

For clinicians and service planners, the current evidence supports online DBT adaptations as a promising, scalable option worth continued clinical use and monitoring, particularly where in-person DBT is inaccessible, though not yet as a formally equivalent alternative across all populations. For researchers, the field would benefit from harmonizing core outcome measures across future online DBT trials, so that subsequent reviews can pool a much larger share of the accumulating evidence base than was possible here.

V. CONCLUSION

Online dialectical behavior therapy interventions demonstrate a consistent, favorable directional effect on emotional and behavioral outcomes across diverse adult clinical populations, but the current RCT evidence base is thinner and more fragmented than its raw study count suggests. Only two of seven eligible trials could be quantitatively pooled, yielding a statistically significant but imprecise effect on emotion dysregulation (SMD = –0.34, 95% CI [–0.65, –0.04]) rated low to very low certainty. Larger, harmonized, multi-site trials are needed before online DBT can be recommended as an evidence-equivalent alternative to in-person delivery across the populations reviewed here

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