Outcomes of Brief Versions of Dialectical Behaviour Therapy for Diagnostically Heterogeneous Groups in A Routine Care Setting

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Abstract

**Introduction:** Brief versions of Dialectical Behaviour Therapy (DBT) may enhance patient outcomes in diverse service settings. This study examined the effectiveness of two DBT-informed treatments for diagnostically heterogeneous groups in routine practice: 5-day group training in DBT skills (DBT-5) and a 12-week DBT program (DBT-12).

**Methods:** Depression, anxiety, stress, borderline symptoms, self-esteem, and general mental wellbeing were measured at pre-and post-treatment in a sample of inpatients and outpatients (N=395). Rates of clinically significant change on these measures were calculated and effect sizes benchmarked against prior DBT outcome studies. Readmission rates were used to measure treatment response maintenance.

**Results:** Scores on all measures improved significantly from pre- to post-treatment. DBT-5 and DBT-12 yielded similar effect sizes compared to prior DBT outcome studies. At least 43.5% of patients were classified as recovered or improved regarding borderline symptoms at the end of both DBT-5 and DBT-12. Readmission rates were also low (5–6.8%).

**Conclusions:** Brief DBT-informed treatments may offer a fast reduction in symptoms and quicker return to functioning.
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Dialectical behaviour therapy (DBT) (Linehan, 1993) was originally developed for chronically suicidal individuals with Borderline Personality Disorder (BPD) and it has the broadest evidence base with BPD (Ellison, 2020). A recent Cochrane review of 75 randomised controlled trials showed DBT was superior to treatment as usual in reducing BPD symptom severity and self-harm (Storebø et al., 2020), improving emotion regulation (Goodman et al., 2014), and interpersonal functioning (Sinnaeve, van den Bosch, & van Steenbergen-Weijenburg, 2015). DBT is effective for a range of other psychological disorders including treatment-resistant depression (Harley, Sprich, Safren, Jacobo, & Fava, 2008; Kleiber et al., 2017), eating disorders (O’Mara, VanDine, Tarescavage, & Ben-Porath, 2021; Telch, Agras, & Linehan, 2001), post-traumatic stress disorder (Harned, Schmidt, Korslund, & Gallop, 2020), and bipolar disorder (Van Dijk, Jeffrey, & Katz, 2013). This expanding range of application has led to a re-conceptualisation of DBT as a transdiagnostic treatment for pervasive emotion dysregulation and concomitant interpersonal problems (Axelrod, Perepletchikova, Holtzman, & Sinha, 2011; Gratz, Weiss, & Tull, 2015; Neacsiu, Eberle, Kramer, Wiesmann, & Linehan, 2014; Ritschel, Lim, & Stewart, 2015).

Despite DBT’s efficacy (Bohus et al., 2013; Kliem, Kröger, & Kosfelder, 2010; Soler et al., 2009; Storebø et al., 2020), effectiveness studies are needed to quantify the size of improvements on outcomes such as non-suicidal self-injury, suicidality, BPD symptom severity and depression, when routinely administered (Linehan et al., 2015; McMain et al., 2009; Neacsiu et al., 2014; Soler et al., 2009; Zeifman, Boritz, Barnhart, Labrish, & McMain, 2019). Nonetheless, there is less evidence about the effectiveness of shortened versions of DBT adapted for routine care. One exception is Herzog and colleagues’ (2020) naturalistic study of inpatients with BPD, which found that participation in an 8 to12-week program
inpatient program based on DBT was associated with small reductions in BPD symptoms. Thus, one goal of the current study was to quantify the effectiveness of short-term DBT-informed treatment programs adapted specifically for a psychiatric hospital.

Another rationale for exploring the effectiveness of brief, transdiagnostic DBT-informed interventions arises because routine care treats patients with diagnostic heterogeneity and comorbidity. Several studies have assessed the outcomes of DBT-informed programs targeted at specific diagnostic groups outside of BPD, such as anorexia nervosa (Chen et al., 2015), and post-traumatic stress disorder (Bohus et al., 2020; Harned et al., 2020), with encouraging results. However, to our knowledge, only one trial has demonstrated the efficacy of a transdiagnostic DBT skills training program for diagnostically heterogeneous patients with emotion regulation issues (Neacsiu et al., 2014). Given the advantages of transdiagnostic treatment approaches, such as increased efficiency and ease of implementation (Alsawy, Mansell, Carey, McEvoy, & Tai, 2014), a greater understanding of the effectiveness of DBT-informed interventions for diagnostically heterogeneous groups could inform routine clinical practice. Furthermore, as Washburn, Rubin, and Zhou (2018) note, comparing effect sizes by benchmarking may also offer insights into how successfully DBT-informed programs for heterogeneous groups can be implemented in the community.

A further consideration is the type of patient referrals deemed appropriate. Difficulties in emotion regulation and interpersonal functioning are particularly salient in BPD (Linehan, 1993), however, these deficits are arguably at the core of all PDs (Clarkin, Cain, & John, 2015; Johnson, Rabkin, Williams, Remien, & Gorman, 2000; Koenigsberg et al., 2002; Sanislow et al., 2010) and present in non-personality disorders. In addition, Gibson et al. (2014) demonstrated that an intensive, DBT-informed skills training group aimed at reducing self-harm over a 6-week period was associated with reduced rates of deliberate self-harm in a
transdiagnostic inpatient sample. Thus, versions of DBT that can cater to patients with and without primary or secondary personality disorder diagnoses would be valuable.

As a comprehensive treatment, DBT includes: 1) enhancing behavioural capabilities, 2) improving motivation to change, 3) assuring that new capabilities generalise to the natural environment, 4) structuring the treatment environment, and 5) enhancing therapist capabilities and motivation (Linehan, 1993). In standard DBT, these functions are separated among different modes of treatment, including individual psychotherapy, weekly group skills training, phone consultations (as-needed), and weekly clinician consultation meetings. This intensive program typically runs for 12 months. While DBT is efficacious, similar improvements could potentially be achieved over shorter periods. The first controlled trial of DBT (Linehan, Armstrong, Suarez, Allmon, & Heard, 1991) showed that significant improvements appeared as early as four months into the 12-month program, suggesting that abbreviated treatments may be efficacious. There have since been six-month (Koons et al., 2001; Stanley, Brodsky, Nelson, & Dulit, 2007), five-month (McMain, Guimond, Barnhart, Habinski, & Streiner, 2017), and three-month (Bohus et al., 2004, 2000) programs tested with promising results. Furthermore, in line with the hypothesis that shorter versions of DBT may yield similar improvements to standard DBT, a component analysis published by Linehan and colleagues (2015) demonstrated that a DBT skills training program yielded similar improvements to standard DBT on measures of non-suicidal self-injury and depression despite a considerable difference in treatment hours (31.7 hours in the skills training program vs 55.3 hours for standard DBT). Therefore, investigation of whether shortened adaptations of DBT have the potential to offer similar reductions in psychiatric symptoms to standard DBT is warranted.

Brief versions of DBT have the potential to improve patient outcomes in several ways. First, delivering DBT in a shorter period of time means that risk of self-harm could be
reduced more quickly, increasing patient safety and reducing the need for hospitalization. Faster reduction in symptoms and earlier completion of treatment would also mean that patients are able to more quickly re-engage with valued activities. Second, brief programs enable a larger number of patients to be treated within a specific service setting, reducing cost (Zanarini, 2009) and helping to reduce the unmet need for evidence-based treatments in the community (Shafran et al., 2009). Finally, an abbreviated format may help to reduce the rates of patient drop-out that remain high in many of the longer DBT programs (Rüsch et al., 2008). From a service delivery perspective, DBT can be costly and complex to administer (Perseius, Öjehagen, Ekdahl, Åsberg, & Samuelsson, 2003, Priebe et al., 2012). The high costs and labour-intensive nature involved in administering DBT may be necessary given the high levels of symptom-related distress that patients with BPD often face. However, shorter versions of DBT may lead to more efficient use of resources and reductions in costs.

**Aims of the Study**

The aim of the current study was to evaluate the outcomes of two brief DBT-informed treatments delivered to both inpatients and outpatients in routine care. In keeping with recent initiatives that broaden the patient groups that may benefit from DBT, the treatments were delivered to diagnostically heterogeneous groups. Outcomes associated with two versions of DBT-informed treatment were examined. The first was a 5-day intensive group-based training in DBT skills (DBT-5). The second treatment was an abbreviated version of the comprehensive DBT program run over 12 weeks (DBT-12). Using a benchmarking approach (McEvoy & Nathan, 2007; Merrill, Tolbert, & Wade, 2003), effect sizes were compared to outcomes reported in previous meta-analyses and a range of studies that tested both the traditional DBT model and more recent DBT skills-focused treatments. Rates of clinically significant change across treatment on broad (depression, anxiety, and stress) and specific (borderline) symptoms were also examined to provide a clearer picture of treatment response.
Method

Participants
The study used naturalistic data from 395 patients who were admitted to an Australian private psychiatric hospital in Perth between 2014 and 2016. Data were collected from patients throughout treatment as part of an ongoing evaluation program at the hospital (Table 2). The sample consisted of inpatients (45.2%) and outpatients (54.8%). Inpatients required short-term in-patient management and treatment during an acute phase of mental illness. Outpatients at the hospital were those who were able to be treated effectively and safely in the community. In the current study, outpatients were permitted to attend DBT-5 or DBT-12 at the facility during the daytime and return home for the evening. All participants in the study were referred by their treating psychiatrist, who remained their psychiatrist throughout treatment. While this meant that some individuals were on psychiatric medication during data collection, medication intake was not strictly monitored in the study as this information was not regularly collected from patients as part of routine care.

Patients were diagnosed by their treating psychiatrist once before treatment according to the ICD-10 criteria (National Centre for Classification in Health Publications, 2002). A minority of patients received primary (18.7%) or secondary (20.9%) PD diagnoses. Of those with primary PD diagnoses, 80.2% received diagnoses of BPD. Of those receiving secondary PD diagnoses, the majority received primary diagnoses of mood (44.9%) and anxiety (35.5%) disorders, and a minority received primary diagnoses of substance use disorders (14%) and other disorders including behavioural disorders and schizophrenia (5.6%). Of those without a primary or secondary PD diagnosis, a majority received primary diagnoses of mood (49%) and anxiety (33.5%) disorders. The remainder received diagnoses of substance use disorders (9.4%) and others including behavioural disorders and schizophrenia (8.1%). Rates of secondary diagnoses are displayed in Table 2.
Informed consent was obtained at admission and study procedures were approved by the relevant institutional ethics review board (approval RA4/20/4295). While Socioeconomic Status was not recorded, patients had private health insurance and thus the typical profile for the hospital is that 80% of patients are in the top 50th percentile of indicators of economic advantage (Hope, Hooke, & Page, 2009). Patients at the hospital consist of individuals in the population who choose to pay for private health insurance, which covers hospital costs.

**Materials**

*Depression, Anxiety, and Stress Scales (DASS-21)* (Lovibond & Lovibond, 1995). The DASS-21 is a self-report measure of depression, anxiety and stress with good psychometric properties, including high convergent and discriminant validity (Antony, Bieling, Cox, Enns, & Swinson, 1998; Gloster et al., 2008; Henry & Crawford, 2005; Page, Hooke, & Morrison, 2007). Each seven-item scale has four response options ranging from 0 (did not apply to me at all) to 3 (applied to me much, or most of the time). Higher scores on each scale indicate higher depression, anxiety, and stress. The DASS-21 has good internal consistency reliability (> .85) (Henry & Crawford, 2005). The DASS-21 yields moderate to strong correlations with scales that measure similar constructs, such as the Beck Depression Inventory, the Beck Anxiety Inventory and the Positive and Negative Affect Scale (Antony et al., 1998; Oei, Sawang, Goh, & Mukhtar, 2013). The internal consistency reliability of the DASS-21 in the current sample was $\alpha = .88$.

*Health of the Nation Outcome Scale (HoNOS)* (Wing et al., 1998). The HoNOS is a 12-item clinician rating measure of health and social functioning covering 12 domains such as ‘behavioural problems’ and ‘problems with social relationships’. Clinicians rate each item on a 5-point scale, with responses ranging from 0 (no significant problems) to 4 (severe problems). Ratings of two or more indicate a clinically significant problem in that domain.
The HoNOS has acceptable test-retest reliability and good construct validity (Wing et al., 1998). The internal consistency reliability of the HoNOS in the current study was $\alpha = .88$.

**Rosenberg Self-Esteem Scale (RSE)** (Rosenberg, 1979). The RSE is a 10-item scale measuring global self-esteem. This widely used self-report instrument has demonstrated good psychometric properties in multiple studies (Baumeister, Campbell, Krueger, & Vohs, 2003; Gray-Little, Williams, & Hancock, 1997). Patients rate agreement with items on an 8-point scale ranging from 1 (agree not at all) to 7 (agree very strongly), with higher scores indicating greater self-esteem. The internal consistency reliability of the RSE in the current study was $\alpha = .81$.

**Short Form 14 Health Survey Questionnaire (SF-14)** (Brazier et al., 1992). The SF-14 is a 14-item self-report measure assessing health status on eight dimensions, with four of these relevant to mental health (role limitations, vitality, social functioning, and mental health). Patients respond to items on a 6-point scale ranging from 1 (all of the time) to 6 (none of the time). Higher scores on each of these scales indicate higher mental health and wellbeing. The SF-14 has good internal consistency reliability (> .85) and acceptable convergent and discriminant validity. The internal consistency reliability of the SF-14 in the current study was $\alpha = .82$.

**Borderline Symptom List - Short Version (BSL-23)** (Bohus et al., 2008). A measure of borderline symptoms was included given these reflect core deficits in emotion regulation and interpersonal functioning that are a primary target of DBT. The BSL-23 is a briefer version of the original Borderline Symptom List (BSL) (Bohus et al., 2007) with good psychometric properties (Bohus et al., 2008). Patients rate their experience of symptoms such as self-hate and mistrust of others over the previous week on a Likert scale ranging from 0 (not at all) to 4 (very strong), with higher scores indicating higher levels of symptoms.
associated with BPD. The internal consistency reliability of the BSL-23 in the current study was $\alpha = .79$.

**Treatments**

Patients attended DBT-5 or DBT-12 based on the referral of their treating psychiatrist. Only psychiatrists could refer patients to the programs. After assessing individual patients, psychiatrists at the hospital can elect to refer patients to DBT-5 or DBT-12 if they deem that either of these is the most appropriate treatment for a given client. Psychiatrists can choose to refer patients to DBT-5 or DBT-12 out of a suite of other treatment options that are offered at the hospital, such as a 10-day CBT program. Psychiatrists connected to the hospital, as well as psychiatrists working independently in private practice clinics throughout Perth can refer patients to the DBT programs. As such, data on the criteria for clinical judgment that individual psychiatrists may have used in the process of deciding on whether to refer patients to the DBT programs were unavailable. Therapists administering the DBT programs also checked each referred patient for suitability prior to the start of the programs.

All patients were voluntarily admitted. Patients were not permitted to enrol in other group therapy programs while undergoing either DBT-5 or DBT-12. The protocols for DBT-5 and DBT-12 were based on Linehan’s (2015) DBT Skills Training Manual (2nd Edition), which was adapted to 5-day and 12-week curriculums. Since the current study was conducted as part of the routine operation of the hospital, therapists did not undergo a formal training program for using the manuals. However, senior clinicians trained all therapists in the use of the manuals. In addition, therapists had ongoing supervision about the use of the manuals and there were regular meetings where therapists could discuss any issues regarding adherence to the treatment manuals.
DBT-5. This intensive skills-based group program is run over five consecutive days and aims to introduce patients to DBT skills. The total amount of time patients spend in the DBT-5 group program is 15 hours. Patients attend two 1.5-hour sessions per day for each of the five days in groups ranging from eight to nine members. No other components of the comprehensive DBT protocol, such as individual sessions with a therapist, are provided during this program.

Each day of DBT-5 follows a common structure that includes reviewing active practice, psychoeducation and skills teaching, and in-session practice of skills. While group skills training in standard DBT is usually administered in two-hour sessions, the abbreviated nature of DBT-5 means that more manual content needs to be delivered each day to ensure that patients receive adequate training in each of the four DBT skills areas. To facilitate better patient concentration and engagement, three hours’ worth of content is delivered in two 1.5-hour sessions, with a break in between. Except for the first day of the program, which uses the 1.5-hour session to administer pre-treatment measures and provide an orientation to the program, the first 1.5-hour session of each day is used to complete a group review of the previous day’s DBT skills practice. After the review of the previous day’s DBT skills practice, therapists provide psychoeducation on another type of core DBT skill.

DBT-12. This abbreviated DBT-informed treatment consists of weekly group skills training sessions, weekly individual therapy sessions lasting for one hour each, and phone-based skills coaching on an as-needed basis. Like the standard DBT protocol, these individual therapy sessions focus on helping patients to hone their DBT skills use and generalize the application of skills across life domains. The total amount of time patients spend in the group skills training component of the DBT-12 program is 36 hours. Skills training is conducted in once-weekly group sessions that last for three hours each (divided in two 1.5 hour sessions with a short break in between), where an equal amount of time is
dedicated to reviewing the core DBT skills modules (mindfulness, distress tolerance, emotion regulation, and interpersonal effectiveness) across the program. Similar to the DBT-5 program, there is also a crisis planning module in the last session.

The overarching structure of DBT-12 is as follows. The first half of the first session is spent orienting patients to the core philosophies underlying DBT (e.g., the central dialectic of acceptance and change). Each DBT skills module takes four sessions to administer. The last session aims to provide patients with skills to assist with managing future distress. More specifically, in this last session patients are asked to plan for potential future crises and think about how they may use DBT skills to resolve these crises.

The session content of DBT-12 is the same as that taught in DBT-5. However, this content is delivered in a more protracted format, with more time for review of in-session skills practice. Each session consists of three components. First, skills practice over the previous week is reviewed. Second, new skills are introduced and psychoeducation on these skills is provided. The last part of the session involves in-session practice of new skills.

In DBT-12, patients attend weekly group skills training sessions in groups of eight to 11 members. In addition to the group sessions, weekly individual sessions of one hour are used to assist patients to generalize skills. Those who complete the program as outpatients can phone the hospital 24 hours a day for crisis support as needed. However, unlike in comprehensive DBT, patients consult with a mental health nurse trained in crisis-related skills-coaching over the phone, rather than with their individual therapist. Those completing the program as inpatients can consult with a mental health nurse in person as required.

In contrast to standard DBT, there is no formal therapist consultation arrangement in DBT-5 or DBT-12. Instead, irregular therapist consultations were organised by therapists as needed. The irregularity of meetings was due to treatment groups occurring during office
hours, and the other set of groups occurring during weekends. As a result, ad hoc therapist consultations occurred when therapists felt that they were required.

Therapists’ adherence to the treatment manuals was not measured, as the study relied on archival data that were collected as part of the routine delivery of treatment. However, all staff were trained in the use of the manuals for DBT-5 and DBT-12. A summary of DBT-5 and DBT-12 is presented in Table 1.

**Therapists**

Six therapists ran DBT-5 and DBT-12. Five out of six therapists were female. Three therapists were psychologists; two of whom had Masters-level qualifications and one of whom had completed a PhD, as well as a Masters degree. Two of the therapists were occupational therapists and one was a mental health nurse. The occupational therapists and mental health nurse had Bachelor degree qualifications relevant to their professions. At the beginning of data collection, therapists’ experience with DBT ranged from three to 20 years, with most of the therapists having practised DBT for over five years. The same therapists ran both DBT-5 and DBT-12. While the therapy team did not hold formal accreditation in DBT, all therapists learned how to administer DBT through a combination of their university training, attending workshops on DBT and supervised workplace training.

The individual therapists in DBT-12 were different to those who ran the skills training groups. Clinical psychologists and occupational therapists with a minimum of three years’ experience with DBT comprised the individual therapists in DBT-12.

**Analytic Approach**

Little’s Missing Completely at Random (MCAR) test indicated that the missing cases did not statistically deviate from randomness, indicating that data were either missing completely at random or missing at random. ($\chi^2(129) = 125, p = .52$). Missing values
were therefore imputed using the SPSS multiple imputation algorithm specifying 10 iterations. Multiple imputation is considered a robust method for handling missing data and has the potential to reduce bias as a result of selective attrition (Asendorpf, Van De Schoot, Denissen, & Hutteman, 2014; Enders, 2017).

One-way repeated measures analyses of variance (ANOVA) were used to assess changes in scores from pre- to posttreatment. The results of these analyses are presented in Table 3. Effect sizes associated with changes in scores from pre- to post-treatment were also calculated (Table 3). We first examined outcomes across DBT-5 and DBT-12 and determined whether the amount of pre- to posttreatment change differed between these two groups. Outcomes were benchmarked against the existing literature following the approach taken in previous studies (McEvoy & Nathan, 2007; Merrill et al., 2003). To provide a clearer picture of treatment response, clinical significance of the changes pre- to posttreatment on measures of broad (DASS-21) and specific (BSL-23) symptoms were calculated using the Jacobson and Truax (1991) method. This approach identifies a cut-off between “functional” and “dysfunctional” populations, enabling calculation of the proportion of patients achieving scores in the healthy range at the end of treatment (cut-off point “C”). For the DASS, cut-off scores on each of the subscales were determined using data from clinical (Page et al., 2007; Ronk, Hooke, & Page, 2012) and non-clinical (Lovibond & Lovibond, 1995) samples. A cut-off score for the BSL-23 was calculated using the clinical and normal population data reported by Kröger, Harbeck, Armbrust, and Kliem (2013). Only patients with both pre- and posttreatment data available were included in these analyses.

**Benchmarking Approach**

We compared the current results against outcomes achieved in studies applying a traditional DBT model. A meta-analysis by Kliem, Kröger, and Kosfelder (2010) included 16 studies examining DBT outcomes, comprising eight randomized controlled trials and eight
uncontrolled trials. All participants had a primary diagnosis of BPD and studies that did not include all components of the DBT manual were excluded. There was an average global effect size pre-post treatment of $d = .50$, 95% CI [.43, .57]. Another meta-analysis by (Öst, 2008) reported a similar global effect size of $d = .58$, 95% CI [.38, .77] across 13 studies examining DBT primarily for BPD, and DBT modified for eating disorders and depression.

For a more detailed comparison, we identified studies reporting comparable effect sizes for depression, anxiety, borderline symptoms, interpersonal problems, and mental health/wellbeing. These studies were divided into two categories (see appendix for list of studies). The first of these categories consisted of studies that examined the outcomes of standard DBT or adaptations of standard DBT (i.e., programs that offered group skills training as well as individual therapy and phone consultation). The second of these categories consisted of studies that assessed the outcomes of standalone DBT skills-training programs.

As per other benchmarking studies (McEvoy & Nathan, 2007; Merrill et al., 2003), at least two effect size comparisons were required for each outcome variable. This enabled effect sizes in the current study to be compared to the range of effect sizes achieved in these prior relevant studies. Given only one skills-focused study reporting a comparable effect size for interpersonal problems could be identified, this outcome domain was included only in the traditional/adapted DBT comparison. The studies included used both controlled and uncontrolled designs and spanned a range of diagnoses and targeted problem areas in both inpatient and outpatient populations. Where effect sizes were not reported, Cohen’s $d$ values were calculated using mean differences pre- to posttreatment and pooled standard deviations.

**Results**

**Relationships Among PD Diagnosis, Admission Type and Outcome Variables in DBT-5 and DBT-12**
A 2 × 2 × 2 mixed-model ANOVA was conducted for each outcome variable, with time (pretreatment, posttreatment) as a within-groups variable and PD diagnosis (with PD, without PD) and admission type (inpatient, outpatient) as between-groups variables. Significant improvements in pre- to post-treatment scores were observed across all outcome measures (Table 4).

On the HoNOS, Time x Admission Type interaction was significant \( (p < .001) \), such that the reductions in HoNOS scores for inpatients (Pre-treatment \( M = 16.50, SD = 3.54; \) Post-treatment \( M = 10, SD = 4.24 \)) tended to be larger than those observed in outpatients (Pre-treatment \( M = 8.60, SD = 3.38; \) Post-treatment \( M = 7.96, SD = 3.18 \)).

The mixed-model ANOVA for self-esteem revealed that the Time x Admission Type interaction was significant \( (p < .001) \), such that inpatients (Pre-treatment \( M = 22.23, SD = 6.24; \) Post-treatment \( M = 26.13, SD = 6.24 \)) tended to experience greater improvements in self-esteem than outpatients (Pre-treatment \( M = 22.48, SD = 5.81; \) Post-treatment \( M = 24.92, SD = 6.36 \)).

On the BSL-23, the Time x Admission Type interaction was significant \( (p < .001) \), suggesting that inpatients (Pre-treatment \( M = 44.55, SD = 23.33; \) Post-treatment \( M = 27.87, SD = 20.37 \)) displayed greater reductions in BPD symptoms compared to outpatients (Pre-treatment \( M = 38.19, SD = 21.69; \) Post-treatment \( M = 28.61, SD = 21.51 \)).

The interaction between Time and PD diagnosis was significant \( (p = .02) \) on the role limitations aspect of the SF-14, indicating that patients with a PD diagnosis (Pre-treatment \( M = 20.24, SD = 31.91; \) Post-treatment \( M = 53.57, SD = 41.72 \)) experienced greater improvements in role limitations over the course of treatment than patients without a PD diagnosis (Pre-treatment \( M = 21.46, SD = 32.18; \) Post-treatment \( M = 43.04, SD = 41.26 \)).
With respect to vitality scores on the SF-14, the Time x Admission Type interaction was significant ($p = .01$), suggesting that inpatients (Pre-treatment $M = 25.57$, $SD = 20.24$; Post-treatment $M = 41.50$, $SD = 24.27$) displayed greater reductions in BPD symptoms compared to outpatients (Pre-treatment $M = 30.79$ $SD = 21.68$; Post-treatment $M = 39.88$, $SD = 24.17$).

The Time x Admission Type interaction on the mental health component of the SF-14 was also significant ($p = .001$), such that inpatients (Pre-treatment $M = 32.66$, $SD = 20.09$; Post-treatment $M = 52.58$, $SD = 25.07$) demonstrated larger improvements in mental health scores compared to outpatients (Pre-treatment $M = 42.74$, $SD = 21.55$; Post-treatment $M = 54.05$, $SD = 21.31$).

Finally, results of the mixed model ANOVA conducted for social functioning on the SF-14 revealed a significant Time x Admission Type interaction ($p = .01$). Examination of the means revealed that inpatients (Pre-treatment $M = 25.52$, $SD = 26.45$; Post-treatment $M = 50.39$, $SD = 29.28$) showed greater increases in social functioning than outpatients (Pre-treatment $M = 44.15$, $SD = 27.28$; Post-treatment $M = 58.43$, $SD = 28.14$).

**Attrition Rates and Readmissions Within 28 Days for DBT-5 and DBT-12**

Individuals who did not attend two consecutive sessions for either DBT-5 or DBT-12 were considered dropouts. DBT-5 was associated with the lower dropout rate (18% vs DBT-12 - 32%). Treatment discontinuers did not differ from treatment completers on diagnostic status (PD diagnosis, non-PD diagnosis), gender, marital status, or age (all $p$’s $> .05$). The dropout rates in DBT-5 and DBT-12 are consistent with those found in other studies, which range from approximately 17% to 39% (Koons et al., 2001; Linehan et al., 2006; McMain et al., 2009; Verheul et al., 2003).
In DBT-5 there were 17 (6.50%) inpatient readmissions to the same hospital within 28 days of treatment completion or withdrawal, while in DBT-12 there were seven (5%). These rates of readmission were not statistically significantly different (p’s > .05).

**Benchmarking**

Effect sizes for outcome measures across treatment groups are displayed in Table 3. According to (Cohen, 1998) guidelines, effect sizes of .20, .50, and .80 represent small, moderate and large effects, respectively. Cohen’s $d$ values were derived by calculating the mean difference between scores at pre-treatment and post-treatment and dividing the mean difference by the pooled standard deviation. Effect sizes across DBT-5 and DBT-12 ranged from small to large ($d = .23 - .93$).

In both DBT-5 and DBT-12, effect sizes for depression, anxiety, stress, mental health/wellbeing, interpersonal problems and borderline symptoms matched or exceeded those reported in recent meta-analyses ($d = .50 - .58$). Specific symptom changes were benchmarked by comparing effect sizes on each selected comparison outcomes for the relevant type of treatment (skills training programs versus standard DBT or adaptations of standard DBT). More specifically, effect sizes of DBT-5 were compared to the effect sizes of DBT skills training programs. Similarly, the effect sizes associated with DBT-12 were compared to the effect sizes of standard DBT or comprehensive adaptations of standard DBT.

For DBT-5, effect sizes were within range of the skills-based comparison studies on depression ($d = .69$, range across previous studies= .31 - 2.34), anxiety ($d = .46$, range across previous studies = .46 - 1.34), and mental health/wellbeing ($d = .79$, range across previous studies  = .80 - 1.12). However, the effect size associated with change in borderline symptoms in DBT-5 ($d = .70$) was below the range in previous studies (range = .81 – 1.26).

In DBT-12, effect sizes were also within or above the range reported in traditional/adapted traditional comparison studies on depression ($d = .70$, range across
previous studies = .21 - 1.28), anxiety (\(d = .46\), range across previous studies = .31 - 1.16), interpersonal problems (\(d = .68\), range across previous studies = .39 - .98), mental health/wellbeing (\(d = .79\), range across previous studies = .29 - .45) and borderline symptoms (\(d = .72\), range across previous studies = .54 - 1.23).

Despite slight differences between the effect sizes of DBT-5 and DBT-12, most effect sizes for both treatments fell within the moderate to large categories (Cohen, 1998).

**Baseline Comparisons Between DBT-5 and DBT-12**

Independent samples t-tests were performed for each of the outcome measures to determine whether pre-treatment scores differed across DBT-5 and DBT-12. A Bonferroni corrected p-value of .01 was used (0.05/10 tests and adjusted degrees of freedom are reported when Levene’s tests for homogeneity of variances were significant).

There were no significant differences between scores on the BSL-23 across DBT-5 and DBT-12 at pre-treatment, \(t(315) = .62, p = .53\); the DASS-21 Anxiety \(t(257.85) = .10, p = .92\); DASS-21 Stress, \(t(317) = .38, p = .71\); and DASS-21 Depression, \(t(261.69) = 1.85, p = .05\); the Rosenberg Self-Esteem Scale, \(t(316) = .12, p = .90\); the HoNOS, \(t(82) = 1.82, p = .31\); SF-14 role limitations scores, \(t(191.90) = 2.59, p = .02\) and SF-14 vitality scores, \(t(317) = 1.16, p = .35\).

On the SF-14, Mental Health scores for DBT-12 patients (\(M = 42.89, SD = 19.59\)) were significantly higher than those for DBT-5 patients (\(M = 35.54, SD = 21.08\)), \(t(317) = 3.05, p < .001\) as were the Social Functioning scores that were higher for DBT-12 patients (\(M = 30.34, SD = 26.99\)) than DBT-5 patients (\(M = 47.32, SD = 35.47\)), \(t(317) = 5.56, p < .001\).

While independent samples t-tests revealed significant differences between the DBT-5 and DBT-12 groups on mental health and social functioning, examination of effect sizes did not suggest strong differences between the two groups at baseline. Examination of the effect sizes for mental health revealed that the Cohen’s d values for DBT-5 and DBT-12 were
identical ($d = .79$). However, the effect sizes for social functioning appeared to differ across DBT-5 ($d = .82$) and DBT-12 ($d = .68$). Thus, we did not find evidence indicating that there was a systematic pattern where unbalanced symptom severity across DBT-5 and DBT-12 was related to similar effect sizes.

**Clinically Significant Change**

Rates of clinically significant change on the DASS and BSL-23 are reported in Table 5. Around half of patients were improved or recovered on the depression and stress scales across the two treatment groups. Rates of clinically significant change were lower on the anxiety scale, with around one third of patients classified as improved or recovered. On the BSL-23, around one half to two thirds of patients were classified as improved or recovered.

**Discussion**

The current study examined the outcomes associated with two brief DBT-informed interventions that were delivered to diagnostically heterogeneous inpatients and outpatients in a routine care setting. The two versions of treatment examined were a 5-day intensive group-based program providing training in DBT skills (DBT-5) and an abbreviated DBT-informed treatment run over 12 weeks (DBT-12). Both groups showed significant improvements from pre- to post-treatment across most outcomes measured, with effect sizes in the moderate to large range. Moreover, effect sizes were at least as strong as the global effect sizes reported in prior meta-analyses (Kliem et al., 2010; Öst, 2008) and were largely within range of the comparison studies that tested traditional or skills-focused DBT programs (e.g., Linehan et al., 2015; McMain et al., 2017). A large proportion of patients were classified as improved or recovered on broad (depression, anxiety, stress) and specific (borderline) symptom measures at the end of treatment. These outcomes are striking given the relative brevity of the treatments and the heterogeneity of the sample.
The effectiveness of DBT-5 in the current study aligns with the systematic review by Valentine et al., (2005), where the authors that concluded DBT skills training as a stand-alone treatment may be efficacious for addressing mood and other non-personality disorders. However, these researchers also noted that the evidence base at that point in time indicated skills training alone may not be sufficient to address borderline symptoms such as suicidality and self-harm. In the current study, patients who completed DBT-5 reported significant reductions in BPD symptoms from pre- to posttreatment, with moderate to large effect sizes. This is consistent with the results of other published studies that have assessed the effectiveness of DBT skills training programs (Linehan et al., 2015; McMain et al., 2017), which suggest that even brief training in DBT skills as a stand-alone treatment may be effective in reducing BPD symptoms in individuals with BPD, as well as those who do not meet criteria for BPD but still experience distress related to BPD symptoms. Thus, abbreviated DBT-informed treatments such as DBT-5 and DBT-12 may enhance patient outcomes by offering fast reduction in symptoms and a quicker return to functioning.

One potential explanation for the finding that DBT-5 and DBT-12 yielded effect sizes similar to those reported in published studies despite the brevity of these interventions compared to standard DBT relates to the good-enough level model of patient change (Barkham et al., 2006). This model proposes that clients and therapists mutually regulate treatment duration and levels of symptom improvement so that treatment ends when clients have reached improvement to a good-enough extent (Barkham et al., 2006). Consistent with the good-enough level model of patient change (Barkham et al., 2006), patients who received DBT-5 and DBT-12 may have seen benefit in the lesser amount of time and effort involved in this program and increased their degrees of focus and adherence to this program to ensure positive treatment outcomes (Stiles, Barkham, Connell, & Mellor-Clark, 2008). Thus, one possible avenue for future research could be to observe patterns of change over the course of
longer DBT-informed interventions using a longitudinal research design to determine whether symptom reduction indeed occurs early in treatment.

Another finding of the current study was that there were largely no significant differences in outcomes between patients with and without a PD diagnosis. The only exception to this pattern was role limitations on the SF-14, which assessed limitations in usual role activities because of emotional problems. Several studies have shown that disordered personality may predict more severe role limitations (Powers & Oltmanns, 2012; Skodol et al., 2005). However, a study by Herzog et al., (2020) demonstrated that patients with high perceived emotional role limitations at pre-treatment experienced higher treatment gains over the course of an inpatient DBT program. The authors proposed that these patients may have been more motivated to engage in treatment due to the greater extent to which they felt restricted by their symptoms and therefore were better placed to reap the benefits of treatment (Herzog et al., 2020). Similarly, patients with PD diagnoses in the current study, who similarly displayed higher baseline role limitations than other patients, may have been more motivated to engage in treatment, which could have then led to greater symptom improvements compared to those without PDs. Nonetheless, our overall findings are broadly consistent with the recent trend towards a transdiagnostic implementation of DBT (Neacsiu et al., 2014), and suggest that abbreviated versions of DBT such as DBT-5 and DBT-12 are suitable for application in diagnostically heterogeneous groups.

Results of the mixed-design ANOVAs in the current study also suggest that inpatients may have improved more than outpatients on several measures including clinician-rated psychological distress, self-esteem and quality of life. A possible explanation for the finding that inpatients may have experienced larger improvements in these areas than outpatients could relate to the tendency for inpatients to enter treatment with more severe psychiatric symptoms. As such, inpatients may have more room to experience symptom improvement
compared to outpatients. Another possible explanation for the observation that inpatients showed greater improvements on clinician-rated psychological distress, self-esteem and quality of life is that the inpatient environment may have provided a high level of containment and respite, such that patients were able to focus on developing their DBT skills. However, since the current study relied on archival data that were collected as part of routine practice, it cannot be inferred that inpatient treatment was necessarily more effective than outpatient treatment. Importantly though, the results of the current study show that DBT-5 and DBT-12 may be beneficial for both inpatients and outpatients. This finding is consistent with the conclusion of Bloom and colleagues’ (2012), which suggested that DBT can be administered effectively in both inpatient and outpatient settings. More research that uses experimental designs to compare the outcomes of DBT-informed treatments across inpatients versus outpatients may be helpful in determining which treatment mode is more effective.

With regards to treatment engagement, attrition rates across groups compared favourably to those reported in other DBT effectiveness studies. Kliem et al., (2010) reported an average dropout rate of 27.3%, however Ost (2008) found attrition ranged from 6% - 59%. Interestingly, the rate of dropouts was higher in DBT-12 (32%) than in DBT-5 (18%), potentially due to the more protracted nature of DBT-12 compared to the brevity of DBT-5. The higher rate of attrition in DBT-12 may also explain the greater rate of symptom deterioration in this program relative to that observed in DBT-5 (e.g., deterioration rate of 16.7% in DBT-12 compared to 5.4% in DBT-5 on BPD symptoms). Despite the differences in dropout rates across the DBT-5 and DBT-12, readmissions within 28 days were low across both two groups, suggesting that treatment gains were maintained in the majority of patients and the programs were effective in keeping people out of hospital. This is an important outcome given the significant costs associated with inpatient hospitalization and the disruption this creates for patients’ lives (Bloom, Woodward, Susmaras, & Pantalone, 2012).
While short-term behavioural treatment programs based on DBT such as DBT-5 and DBT-12 appear to be effective as standalone treatments, one potential direction for future research could be to examine whether participating in abbreviated DBT-informed treatments serves to improve treatment retention and engagement once patients enter longer DBT programs. Improved access to care and shortened waitlists could serve as further benefits of offering brief DBT-interventions prior to enrolment in standard DBT. However, more research using a control group is required to establish whether attending brief DBT-informed interventions prior to standard DBT enhances outcomes.

Another area that warrants further research is the cost effectiveness of shortened DBT-informed interventions. While cost effectiveness was not measured in the current study, a study by Haga et al., (2018) demonstrated that a 19-week adaptation of DBT for outpatients had a high probability of being a cost effective treatment. Thus, DBT-5 and DBT-12 may similarly have the potential to be cost effective interventions. The relative cost effectiveness of DBT-5 and DBT-12 could also be useful to examine. The therapist contact hours required for DBT-5 (15 hours) are less than the amount of contact hours involved in administering DBT-12 (36 hours), suggesting that DBT-5 could be more cost effective than DBT-12. Information on the relative costs of these two programs could be useful for services looking to implement various options for patients that may improve access to DBT.

Another valuable avenue for future research could be to identify predictors of treatment success in abbreviated DBT-informed programs. Herzog et al., (2020) identified high levels of emotion dysregulation and the absence a history of outpatient admissions as predictors of treatment gains in a short-term DBT program for inpatients with BPD. Given these findings, it may be worthwhile for future studies to investigate whether these factors also predict treatment outcomes in abbreviated, transdiagnostic DBT-informed interventions for inpatients and outpatients, such as DBT-5 and DBT-12. Elucidating predictors of
treatment success in DBT-5 and DBT-12 may provide a greater understanding of how services can better match individual patients to shorter- or longer-term DBT-informed interventions to ensure optimal treatment outcomes.

The current study had several limitations. First, the lack of a control group means the sample may have improved without treatment. However, given that numerous randomised controlled trials have already investigated the efficacy of standard DBT and adaptations of DBT, demonstrating the specificity of treatment effects was not a primary goal of the current study. Future studies may benefit from examining the efficacy of these treatments using a randomised controlled trial design. In addition, since the current study relied on archival data that were collected in a routine care setting, there were no formal assessments of the reliability of patients’ psychiatric diagnoses. As such, the extent to which diagnoses assigned by psychiatrists in the current study were reliable is unclear. Future studies could aim to incorporate additional checks to ensure the reliability of patients’ psychiatric diagnoses.

A second limitation is the lack of follow-up data. Although rates of re-admission within 28 days were low across all treatment groups, insight into the maintenance of the treatment effects across time is limited. For example, it is uncertain whether the treatment gains inpatients experienced were maintained after discharge. Follow-up data on inpatients would have been helpful in clarifying whether symptom improvements persisted after patients returned to their everyday contexts, which is likely due to the lack of the supports available in inpatient settings (e.g., routine symptom monitoring). Examining outcomes over the longer term is important, particularly for the type of patient population serviced by this kind of program, and we are currently in the process of collecting these data for the current treatments. Third, all measures except for the HoNOS in the current study were self-report, meaning that patients may have inaccurately reported their symptoms and DBT skills use.
Future studies could therefore benefit from incorporating more clinician-rated measures of psychiatric symptoms and DBT skills use, which would increase the accuracy of results.

Another limitation of the current study is that although patients were not permitted to enrol in treatments other than DBT-5 and DBT-12 at the hospital where these two programs were administered, external influences such as patients’ ability to enrol in treatments at other clinics were not strictly accounted for. However, for reasons of cost and convenience, it is only likely to have been in exceptional circumstances that patients completed treatment programs other than DBT-5 or DBT-12. Furthermore, while patients’ use of psychiatric medication could have contributed to symptom improvements, information on patients’ medication intake was not collected as part of routine care. As such, the extent to which patients’ use of psychiatric medication may have contributed to reductions in symptoms could not be examined. Future studies assessing the effectiveness DBT-informed programs in routine clinical practice should aim to collect information about patients’ medication intake, so that the effects of medication can be accounted for. In addition, treatment fidelity was not assessed, so it is possible that lack of adherence to treatment manuals may have contributed to biases in estimates of treatment outcomes.

The generalisability of the results from the current study may also be limited because the sample consisted of patients who had the financial resources to for private health insurance, which covered the costs of DBT-5 and DBT-12. The selective nature of the sample may have led to bias in the results. Indeed, Delgadillo, Asaria, Ali and Gilbody (2016) demonstrated that higher socio-economic status was associated with greater rates of recovery. Thus, the extent to which the current study’s results can be generalised to other populations with a lower average socio-economic status is unclear. Future studies may seek to assess the effectiveness of similar behavioural treatment programs in public health settings or with groups featuring a more diverse range of socio-economic status levels.
Finally, some patients did not achieve reliable change and a small proportion deteriorated (see Table 5). This was particularly the case for BPD symptoms, where approximately 50% of patients either did not achieve reliable change or deteriorated, which might suggest that individuals with more severe BPD symptoms benefitted less from the current treatments. It may be that patients with higher levels of BPD symptoms are better suited to comprehensive DBT. In contrast, abbreviated DBT could be more appropriate for individuals with less severe of BPD symptoms.

In conclusion, the current study contributes to existing effectiveness research by providing support for the use of brief adaptations of DBT for diagnostically heterogeneous groups of inpatients and outpatients with core deficits in emotion regulation and interpersonal functioning. Results suggest that a brief (5-day) but intensive training in DBT skills is comparably effective to a longer (12-week) program modelled on comprehensive DBT. The brevity of these treatments can potentially improve patient outcomes by offering faster reduction in symptoms and a quicker return to baseline functioning. These treatments are also well-suited to contemporary settings that service heterogeneous groups of patients and where a continuous stream of referral options is required.

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