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A randomized trial of brief dialectical behaviour therapy skills training in suicidal patients suffering from borderline disorder

McMain SF, Guimond T, Barnhart R, Habinski L, Streiner DL. A randomized trial of brief dialectical behaviour therapy skills training in suicidal patients suffering from borderline disorder.

Objective: Evidence-based therapies for borderline personality disorder (BPD) are lengthy and scarce. Data on brief interventions are limited, and their role in the treatment of BPD is unclear. Our aim was therefore to evaluate the clinical effectiveness of brief dialectical behaviour therapy (DBT) skills training as an adjunctive intervention for high suicide risk in patients with BPD.
Method: Eighty-four out-patients were randomized to 20 weeks of DBT skills (n = 42) or a waitlist (WL; n = 42). The primary outcome was frequency of suicidal or non-suicidal self-injurious (NSSI) episodes. Assessments were conducted at baseline 10, 20 and 32 weeks.
Results: DBT participants showed greater reductions than the WL participants on suicidal and NSSI behaviours between baseline and 32 weeks ($P < 0.0001$). DBT participants showed greater improvements than controls on measures of anger, distress tolerance and emotion regulation at 32 weeks.
Conclusions: This abbreviated intervention is a viable option that may be a useful adjunctive intervention for the treatment of high-risk behaviour associated with the acute phase of BPD.

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Key words: randomized controlled trial; personality disorder; suicide; self-harm; psychotherapy

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Significant outcomes

- Support for the effectiveness of brief skills-based group interventions for borderline personality disorder.
- Superior improvements in the reduction of self-destructive (e.g. suicidal and self-harm) behaviours, aggressive behaviour (e.g. anger) and coping skills (e.g. distress tolerance and emotion regulation) amongst those in the dialectical behaviour therapy skills training group, which were maintained at follow-up.

Limitations

- Ancillary treatments were not excluded.
- Use of self-report for primary outcome measures.

Introduction

Borderline personality disorder (BPD) is a prevalent disorder that has an estimated lifetime prevalence of 6% (1, 2). The suicide rate amongst individuals with BPD is estimated to be as high as 10% (3), while self-harm (with or without suicide intent), which is a strong risk factor for suicide, is reported by 69–80% (4, 5). Apart from the personal and social impacts, self-harm contributes to a significant economic burden due to loss of productivity and high healthcare utilization.

Dialectical behaviour therapy (DBT) has been used successfully in treating BPD, with several

well-controlled trials providing robust evidence for its effectiveness (6). The majority of research supporting the efficacy of DBT for the treatment of BPD pertains to the standard model, which is a 12-month, multi-modal treatment, including individual sessions, skills group, phone coaching and a therapist consultation team. Access to standard DBT is restricted due to limited resources and a shortage of well-trained clinicians, resulting in lengthy waitlists. This situation is not unique; other BPD-specific treatments are similarly restricted. Because standard DBT is perceived as costly and complex to deliver to all patients who need it, many clinical settings are delivering only the skills training component, even though this practice lacks adequate empirical support.

DBT skills-only treatment for BPD has been evaluated in two randomized controlled studies. Soler et al. (7) found 13 weeks of DBT skills training to be superior to standard group therapy in improving BPD symptoms, depression, anxiety, anger and affect instability. In the other RCT, which specifically recruited suicidal and self-injuring patients with BPD, Linehan et al. (8) assigned patients to a one-year intervention of either standard DBT, the skills component of DBT plus intensive case management, or individual DBT sessions only. The results showed that the DBT modes with skills training (e.g. standard DBT or DBT skills training plus intensive care management) were more effective than individual therapy in reducing suicidal and NSSI behaviours. Additional evidence to support the effectiveness of DBT skills-only treatment is needed.

Several trials have evaluated the outcome of brief skills-only-based interventions for BPD patients and have found moderate to large effect sizes (9–12). However, it is unclear whether these abbreviated skills-only interventions are effective in high-risk individuals, because most of the trials did not have suicide or non-suicidal self-injury (NSSI) as a primary outcome or focus. For example, high-risk patients have been viewed as requiring comprehensive treatment that includes individual therapy and between-session phone coaching to adequately manage suicide risk (13). Brief DBT skills training may be a viable treatment alternative for suicidal individuals with BPD. It would be of enormous practical and theoretical value to answer this question.

Aims of the study

The aim of this study was to assess the effectiveness of a brief course of dialectical behaviour therapy skills training designed as an adjunctive intervention for high-risk suicidal individuals with borderline personality disorder in a well-controlled and well-powered pragmatic trial, with the primary outcome being the difference between the dialectical behaviour therapy group and an active waitlist control group in the frequency of suicidal and non-suicidal self-injury behaviours. At this stage, because there are few if any similar trials, a first-generation study that includes a waitlist control condition as a comparator is needed to address the question of whether dialectical behaviour therapy skills training itself is effective. Many borderline personality disorder specialist programmes in the community that offer dialectical behaviour therapy skills training as a stand-alone intervention have lengthy waitlists and lack substitute treatments. In effect, we tested dialectical behaviour therapy skills training against a waitlist, because it is currently the only available option in many real-world clinical settings. Significant effects supporting the superiority of dialectical behaviour therapy skills training compared to a waitlist control would be evidence that improvements in outcome are due to treatment. In the light of the need for effective interventions that are easily transportable and cost-effective, information about the effectiveness of a brief dialectical behaviour therapy skills training intervention is highly relevant.

Material and methods

This two-arm, single-blinded, prospective, randomized controlled trial was designed to evaluate the clinical effectiveness of a 20-week DBT skills training group compared to an active waitlist (WL) group in which ancillary treatments were unrestricted for both groups. The study was conducted between October 2010 and March 2012 at the Centre for Addiction and Mental Health (CAMH), a teaching hospital affiliated with the University of Toronto. The study was approved by the CAMH Research Ethics Board, and written informed consent was obtained from participants prior to enrolment. The costs of treatment were covered by the Canadian public healthcare system.

Study inclusion criteria were as follows: (i) meeting the criteria for BPD as defined in the Diagnostic and Statistical Manual Version IV (DSM-IV) (14), (ii) 18–60 years of age, (iii) two suicidal and/or NSSI episodes in the past 5 years, with one occurring within 10 weeks prior to enrolment and (iv) able to understand written and spoken English. To maximize external validity, exclusion criteria were limited to the following: (i) meeting DSM-IV criteria for a psychotic disorder, bipolar I disorder or dementia, (ii) evidence of an organic

brain syndrome or mental retardation based on clinical interview and (iii) participation in a DBT programme within the past year.

The Structured Clinical Interview I for the DSM-IV (SCID-I) (15) and the International Personality Disorder Exam (IPDE) (16) were used to assess Axis I and Axis II diagnoses respectively. High inter-rater reliability was observed for the number of BPD symptoms (intra-class correlation coefficient = 0.97). Participants were assessed by two doctoral-level psychology students and one master's-level clinician who were well trained on the study instruments and were blinded to treatment assignment, while treatment history interviews were conducted by two research assistants who were not blinded to treatment assignment.

Following completion of baseline assessments, participants were assigned to groups using a standard random block design in block sizes of four. The statistician prepared 42 envelopes, each containing two allocations to each of the conditions in random order.

Treatment and therapists

The DBT group skills training consisted of the manualized approach developed by Linehan (17, 18), adapted to a 20-week curriculum in which groups meet for 2 h weekly. A description of the 20-week skills curriculum can be found in Linehan's skills manual (19). The training uses a psycho-educational focus to enhance capabilities. The following five modules were covered: mindfulness, emotion regulation, distress tolerance, interpersonal effectiveness and dialectics. Prior to the first group meeting, participants attended a 90-min individual orientation session. Skills group leaders were not available to provide crisis coaching outside of skills group sessions. Participants were encouraged to have a therapist or another individual (e.g. family practitioner, spiritual counsellor, family member) who could provide crisis support. Additionally, participants were offered a list of resources for crisis support (e.g. crisis call lines, distress centres). To increase external validity, there were no restrictions on ancillary treatments. Treatment was delivered by five therapists (PhD = 2; MSW = 3) with an average of 8.4 years (SD = 4.66) of experience in facilitating DBT groups for patients with BPD. Therapists attended a weekly consultation team.

Treatment fidelity was evaluated using the DBT Global Rating Scale (GRS; M. M. Linehan, unpublished data, 1993), a 66-item instrument that codes adherence to DBT on a five-point scale, with an overall score of 4 or higher indicating 'adherent'. Adherence ratings were conducted by one well-trained and reliable coder on a random sample of 10% of all videotaped group sessions.

Participants assigned to the waitlist control condition remained on the list for five months (e.g. end of follow-up). At the end of the study, they were offered a place in treatment. During this wait period, participants could continue with treatment-as-usual care (medication management or other psychosocial treatments).

Outcomes

Study assessments were conducted at baseline (pre-intervention), 10 weeks, 20 weeks (end of intervention) and 32 weeks (3-month follow-up). Participants were compensated $10 per hour for completing the assessments.

The primary outcome, frequency of suicidal and/or NSSI episodes, was assessed using two instruments: the clinician-administered Lifetime Suicide Attempt Self-Injury Interview (LSASI; formerly Lifetime Parasuicide Count, M. M. Linehan, K. A. Comtois, unpublished data, 1996) and the self-report Deliberate Self-Harm Inventory (DSHI) (20). The LSASI has similar items to the Suicide Attempt Self-Injury Interview (SASII), which has good inter-rater reliability (0.87–0.98). It has been used in DBT trials to assess the topography of suicidal and NSSI behaviours (8, 21–24). The DSHI is a 17-item self-report measure that assesses the method, frequency and medical severity of deliberate self-harm without suicidal intent. It has high internal consistency (alpha = 0.82), adequate test–retest reliability and good construct validity. The frequency of suicide attempts and NSSI episodes was computed from participants' responses to the LSASI and the DSHI instruments respectively.

Secondary outcomes were changes in healthcare utilization, BPD symptoms and coping. Healthcare utilization was assessed using a semistructured interview, the Treatment History Interview-2 (THI-2) (25), to determine the number of emergency department (ED) visits, psychiatric hospital admissions and use of medications. Symptoms were assessed using the Borderline Symptom List-23 (BSL-23) (26), a self-report scale to assess borderline typical symptomatology; the State-Trait Anger Expression Inventory (STAXI) (27); the Symptom Checklist-90-Revised (SCL-90-R) (28) to measure general psychiatric symptoms; the Barrett Impulsiveness Scale-11 (BIS-11) (29); the Beck Depression Inventory-II (BDI-II) (30); and the Social Adjustment Scale–Self-Report (SAS-SR) (31). Coping was assessed using the Difficulties in

Emotion Regulation Scale (DERS) (32), the Distress Tolerance Scale (DTS) (33) and the Kentucky Inventory of Mindfulness Scale (KIMS) (34).

Participants who dropped out prematurely were requested to complete the Reasons for Early Termination from Treatment Questionnaire (35) to indicate why they had discontinued. The drop-out definition was modified from what is used in a standard one-year DBT programme (e.g. four consecutively missed individual or group sessions) because this was a shorter and single-mode intervention. Treatment drop-out was defined as failure to participate in three consecutive scheduled group sessions or five group sessions in total.

Power and statistical analysis of change

The power analysis was conducted using the rate of change in frequency of self-harm episodes, based on data from the only available relevant study evaluating a time-limited skills training group treatment for self-harm and BPD (9). We expected to see a group difference of 20% in the frequency of suicidal and/or NSSI episodes. Setting the alpha level at 5% and the beta level at 0.20, and estimating a drop-out rate of 30%, it was determined that a sample of 84 participants (DBT = 42; WL = 42) was required to show statistically significant differences.

All analyses were conducted on the intent-to-treat sample ($N = 84$). To assess the effectiveness of our randomization process, between-group comparisons of baseline characteristics on all measures were conducted, using *t*-tests for continuous variables and chi-square tests for categorical/nominal variables.

Several of the primary count measures, such as suicidal and NSSI behaviours, hospitalization days, and ED visits, were non-normally distributed and were therefore analysed using multilevel longitudinal generalized linear models (MLGLM). For suicidal and NSSI variables, a Poisson distribution was used. To control for heterogeneous and inconsistent responses within participants, both random intercepts and occasion-level random effects were estimated for and within each participant (36, 37). For hospitalization days and ED visits, due to excessive zero inflation, the data were collapsed to a binary outcome (hospitalizations yes/no and ED visits yes/no) and analysed assuming a logistic distribution.

Multilevel linear growth curve models were used to analyse normally distributed secondary outcome measures, with observations nested within participant (36). Estimates of variance over time between treatment groups indicated heteroskedasticity. This was also evident in the analysis of model residuals. To account for this, each linear model was estimated under the heteroskedastic assumption, with means and variances estimated freely for each group (36).

Each model was reanalysed using preselected covariates that are known or theorized to affect the outcome, and the results were compared with the primary models outlined above to determine whether including covariates caused meaningful changes in the overall findings. Conditional estimates of the means and variances were not found to deviate in the presence of the covariates, and so the unconditional models were selected to not suppress any possible estimates of the treatment effect.

Using these methods, the statistics are based on available case analyses where the full information of the data set can be employed, as the models can accommodate unbalanced and missing data. All models were estimated using restricted maximum likelihood (REML), which is preferable to full maximum likelihood when the samples are small. All comparisons of conditional means were performed with Wald χ^2 tests, and all reported *P*-values were adjusted for family-wise type I error inflation using the Holm's sequential Bonferroni adjustment.

Results

A total of 140 prospective subjects were screened, and 84 eligible participants were randomly assigned to DBT skills training ($n = 42$) or a WL control ($n = 42$). The subject flow is shown in Fig. 1.

Baseline characteristics are shown in Table 1. After correcting for multiple testing, there were no between-group differences in demographic characteristics, clinical characteristics or number of suicidal or NSSI episodes.

Attrition and treatment adherence

Of the 42 participants assigned to DBT skills training, 29 (71%) completed the treatment and 13 (31%) dropped out prematurely. Treatment completers attended a mean of 17.9 sessions (SD = 1.6), while those who dropped out attended a mean of 5.62 (SD = 5.9). The most commonly reported reasons for dropping out were 'didn't think sessions were helpful' ($n = 4$) and 'time problems', 'transportation problems' and 'medical reasons' ($n = 3$ each).

In terms of missing data, study follow-up assessments were completed by 74 participants (88.1%). Participants completed a mean of 2.61 of the three

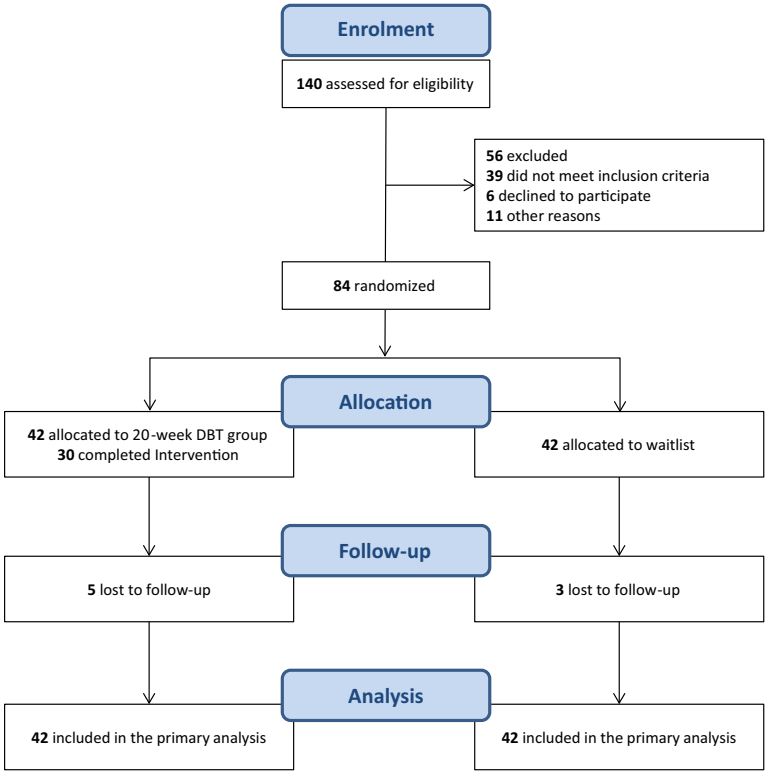

Fig. 1. CONSORT diagram of participants randomized to dialectical behaviour therapy skills training or a waitlist control for borderline personality disorder. [Colour figure can be viewed at wileyonlinelibrary.com]

postbaseline study assessments (DBT group, 2.48+/−0.16; waitlist, 2.74+/−0.12). There was no evidence that missing data patterns were biased by group membership (Fisher's exact test, $P = 0.26$).

At baseline, a total of 71 patients (86%) were taking psychotropic medications, with a mean of 1.79 ± 1.41 medications per participant. There were no significant between-group differences in either the number of patients on medication (DBT = 33/42; WL = 38/42; $\chi^2(1) = 1.67$, $P = 0.20$) or the mean number of medications taken (DBT = 1.52 ± 0.20; WL = 2.05 ± 0.22; $t(80) = 1.73$, $P > 0.05$). At 20 weeks, a total of 57 patients (81%) were taking medication and were averaging 1.62 ± 1.67 medications, with the DBT group reporting both fewer patients on medication (23/32) compared to the WL patients (34/38) and fewer medications (1.52 ± 0.20 vs. 2.05 ± 0.22, $t(80) = 2.10$, $P = 0.04$). There was no significant group difference in the average number of medications at the 32-week follow-up ($t(80) = 0.53$, $P = 0.60$).

At baseline, a total of 71 patients (85%) reported that they were receiving some form of psychosocial treatment from a therapist (DBT = 35/40; WL = 36/39). At 10, 20 and 32 weeks, these numbers were 76% (32/36), 64% (27/32) and 60% (25/37) for the DBT group, and 67% (28/35), 67% (28/38) and 57% (24/39) for the WL participants. There were no between-group differences at any time point (all $\chi^2(1) \leq 1.179$, $P > 0.28$) (See Table 2 for psychosocial treatments utilized by participants over time).

Amongst the specific forms of psychosocial treatments patients were receiving over time, two differences were observed. After adjusting for family-wise error rates, there were no statistically significant differences between groups in the proportions receiving treatment, except for group psychotherapy at 10 weeks (DBT = 26/36; WL = 10/35; $\chi^2(1) = 13.53$, $P < 0.001$) and 20 weeks (DBT = 24/32; WL = 7/38; $\chi^2(1) \leq 22.54$, $P < 0.001$). However, this result was expected because it included the DBT skills treatment.

Treatment adherence ratings were conducted on 10% ($n = 22$) of sessions. The mean score of 4.44 (SD = 0.11) fell within the 'adherent' range.

Outcome analyses

Table 3 shows the results of all outcome analyses, and Fig. 2 illustrates the major findings.

Suicidal and/or NSSI behaviours

There were no completed suicides in either group. Based on MLGLM analyses, the DBT group showed statistically greater reductions in the frequency of suicidal and self-harm episodes as

Table 1. Baseline demographic and diagnostic characteristics for 84 out-patients with borderline personality disorder

	DBT skills (n = 42)	Waitlist (n = 42)	Entire sample (n = 84)	P value
Women	35 (83.3)	31 (73.8)	66 (78.6)	P = 0.29§
Marital status				
Married, common law	3 (7.1)	8 (19.1)	11 (13.1)	P = 0.26§
Separated, divorced, widowed	6 (14.3)	6 (14.3)	12 (14.29)	
Never married	33 (78.6)	28 (66.7)	61 (72.6)	
Education				
<High school	4 (9.52)	1 (2.4)	5 (5.0)	P = 0.44§
High school graduate	5 (11.9)	3 (7.1)	8 (9.5)	
Some college or technical school	13 (31.0)	16 (38.1)	29 (34.5)	
College/university graduate	20 (47.6)	22 (52.4)	42 (50.0)	
Employment				
Unemployed	10 (23.8)	10 (23.8)	20 (23.8)	P = 0.51§
Full time	9 (21.4)	14 (33.3)	23 (27.4)	
Part time	2 (4.8)	4 (9.5)	6 (7.1)	
Full-time student	8 (19.1)	3 (7.1)	11 (13.1)	
Disabled	5 (11.9)	5 (11.9)	10 (11.9)	
Receiving public assistance	8 (19.1)	6 (14.3)	14 (16.7)	
Annual income				
<$15 000	18 (42.9)	15 (35.7)	33 (39.3)	P = 0.61§
Between $15 000 and $29 000	4 (9.5)	4 (9.5)	8 (9.5)	
Between $30 000 and $49 000	3 (7.14)	8 (19.1)	11 (13.1)	
>$50 000	8 (19.1)	7 (16.7)	15 (17.9)	
No answer/refused to answer	9 (21.4)	8 (19.1)	17 (20.2)	
Lifetime DSM-IV axis I diagnoses				
Major depressive disorder	18 (42.9)	17 (40.4)	35 (41.7)	P = 0.83§
Panic disorder	2 (4.8)	3 (7.1)	5 (6.0)	P = 0.65§
Post-traumatic stress disorder	5 (11.9)	6 (14.3)	11 (13.1)	P = 0.75§
Any anxiety disorder	23 (54.8)	24 (57.1)	47 (56.0)	P = 0.83§
Substance abuse	4 (9.5)	2 (4.8)	6 (7.1)	P = 0.40§
Substance dependence	11 (26.2)	13 (31.0)	24 (28.6)	P = 0.63§
Any eating disorder	2 (4.8)	3 (7.14)	5 (6.0)	P = 0.65§
Current DSM-IV axis I and axis II diagnoses†				
Major depressive disorder	23 (54.8)	20 (47.6)	43 (51.2)	P = 0.51§
Panic disorder	4 (9.5)	8 (19.1)	12 (14.3)	P = 0.21§
Post-traumatic stress disorder	8 (19.1)	11 (26.2)	19 (22.6)	P = 0.43§
Any anxiety disorder	21 (50.0)	30 (71.4)	51 (60.7)	P = 0.04*§¶
Substance abuse	7 (16.7)	4 (9.5)	11 (13.1)	P = 0.33§
Substance dependence	24 (57.1)	23 (54.8)	47 (56.0)	P = 0.83§
Any eating disorder	5 (11.9)	8 (19.1)	13 (15.5)	P = 0.37§
	Mean (SD)	Mean (SD)	Mean (SD)	
Current axis I disorders	2.14 (0.29)	2.36 (0.29)	2.25 (0.20)	P = 0.60‡
Lifetime axis I disorders	3.0 (0.33)	2.62 (0.25)	2.81 (0.21)	P = 0.36‡
Lifetime suicide attempts	7.11 (14.5)	115 (694)	61.1 (491)	P = 0.32‡
Age, mean (SD)	27.29 (7.45)	32.05 (9.06)	29.67 (8.62)	P = 0.01‡

DBT, dialectical behaviour therapy; DSM-IV, Diagnostic and Statistical Manual, Version 4.

*Indicates significant difference ($P < 0.05$), $X^2(1) = 5.26$.

†Five participants were missing data, proportions are conservative.

‡Based on independent t-test.

§Based on chi-square.

¶After correcting for multiple testing, the difference between groups on anxiety disorders is not significant.

measured by the LSASI at 32 weeks ($P < 0.04$). On the DSHI, the between-group differences of the frequency of NSSI were in the same direction and approached, but failed to meet significance at 32 weeks ($P = 0.08$).

Healthcare utilization

Based on MLGLM analyses, between-group differences of the number of hospital admissions favoured the DBT group at 10 weeks ($P < 0.001$) and 20 weeks ($P < 0.001$); however, these differences were not apparent at 32 weeks ($P > 0.48$). While there were marginally significant between-group differences in the number of ED visits at 20 weeks ($P > 0.06$) favouring the DBT group, there was no evidence that the differences between groups were statistically significant at 20 weeks or at 32 weeks.

Table 2. Psychosocial treatments utilized by 84 out-patients with borderline personality disorder (By Group Assignment)

	Baseline		10 weeks		20 weeks		32 weeks	
	WL	DBT	WL	DBT	WL	DBT	WL	DBT
Type of psychosocial treatment	*n* (%)		*n* (%)		*n* (%)		*n* (%)	
Individual psychotherapy or counselling	36 (92%)	33 (83%)	26 (74%)	24 (67%)	27 (71%)	24 (75%)	20 (51%)	24 (65%)
Group psychotherapy or counselling*	18 (46%)	20 (50%)	10 (29%)	26 (72%)	7 (18%)	24 (75%)	13 (33%)	9 (24%)
Couples, marital or family psychotherapy or counselling	10 (26%)	6 (15%)	3 (9%)	1 (3%)	3 (8%)	2 (6%)	3 (8%)	1 (3%)
Case management	10 (26%)	8 (20%)	6 (17%)	2 (6%)	11 (29%)	2 (6%)	6 (15%)	2 (5%)
Day treatment	8 (21%)	11 (28%)	5 (14%)	5 (14%)	4 (11%)	1 (3%)	4 (10%)	1 (3%)
Job skills or vocational counselling	2 (5%)	1 (3%)	5 (14%)	0 (0%)	2 (5%)	0 (0%)	0 (0%)	2 (5%)
12 step group, spiritual counselling or direction	6 (15%)	6 (15%)	5 (14%)	2 (6%)	6 (16%)	4 (13%)	6 (15%)	5 (14%)

All observed percentages engaged are calculated from (n/N) where n is the number reported engaged and N is the available cases for that group at the specific time.
*Count includes experimental treatment (e.g. DBT skills training group).

Coping skills

Mixed-effects linear growth curve analyses of the measures of coping skills (distress tolerance, emotion regulation) revealed significantly greater improvements in the DBT group compared to the WL group on distress tolerance and emotion regulation, at all time points. On mindfulness, there were no between-group differences at any time point.

Mental health outcomes

Mixed-effects linear growth curve analyses revealed significantly lower levels of anger in the DBT group than the WL group at all time points. The DBT group had lower levels of anger at baseline; however, the DBT group made greater reductions in anger over time, while the WL group did not (slope difference = −0.25, $z = -2.50$, $P = 0.013$). The DBT group showed significantly greater gains on social adjustment, symptom distress and borderline symptoms at 20 weeks; however, these group differences were not maintained at 32 weeks. There were no significant group differences on impulsivity at any time points.

Clinically significant change

Jacobson et al.'s (38) two-fold criteria were applied to assess clinically significant improvement, as assessed on the SCL-90-R. In the DBT group, 56.3% of all participants showed changes from baseline to 20 weeks that were statistically reliable, and 43.8% fulfilled the criteria for change that was both statistically reliable and clinically significant. In the WL group, these percentages were 28.9% and 18.4% respectively. From baseline to 32 weeks, the percentages in the DBT group who showed changes that were statistically reliable, or both statistically reliable and clinically significant, were 47.1% and 20.6%, respectively, while those in the WL group were 41.0% and 20.5% respectively. Analyses of group differences revealed significant differences in the odds of achieving both statistically reliable change and clinically significant change at 20 weeks (OR = 3.44, $z = 2.25$, $P = 0.024$), but not at 32 weeks. This result was also confirmed on the differences in the odds of achieving statistically reliable change only at 20 weeks (OR = 3.21, z = 2.33, $P = 0.020$), but again not at 32 weeks (See Fig. S3).

Discussion

The vast majority of individuals with BPD are unable to access specialist treatment, and there is an urgent need for less resource-intensive options. The aim of this RCT was to evaluate the effectiveness of a brief DBT skills training group programme designed as an adjunctive intervention for the treatment of high-risk suicidal individuals with BPD. To our knowledge, this is the first pragmatic, randomly controlled trial of an abbreviated format of DBT skills training in this patient population. The results indicate that brief interventions do not need to be restricted to individuals with mild symptoms and may be beneficial to those at high risk for suicide.

The DBT group showed superior improvements in the reduction of self-destructive (e.g. suicidal and self-harm) behaviours. DBT participants also exhibited significantly greater gains in aggressive behaviour (e.g. anger) and in learning coping skills (e.g. distress tolerance and emotion regulation), compared to the control group. Improvements on these outcomes were durable postdischarge, which suggests that DBT skills training was therapeutic. Although DBT participants showed superior outcomes on healthcare utilization (e.g. hospital days and ED visits), social adjustment, symptom distress

Table 3. Outcomes for 84 individuals with borderline personality disorder, by Group Assignment

Outcome measures	Treatment assignment: DBT (n = 42)	Treatment assignment: WL (n = 42)	Between-group difference: Wald χ^2	Between-group difference: P	Cohen's d
Count/dichotomous outcomes (Incident rate/odds ratio)			Wald χ^2	P	
# of Suicidal and self-injurious episodes, mean (SD)** (DSHI)					
Baseline	9.68 (25.89)	10.12 (29.73)			
10 weeks	3.32 (7.97)	5.12 (12.91)			
20 weeks	1.14 (3.26)	2.59 (6.90)	4.77	<0.09	
32 weeks	0.32 (1.27)	1.14 (3.94)	5.32	<0.08	
# of suicidal and self-injurious episodes, mean (SD)** (LSASI)					
Baseline	9.06 (8.31)	8.33 (7.62)			
10 weeks	5.07 (4.26)	5.76 (4.80)			
20 weeks	2.84 (2.36)	3.96 (3.47)	2.73	< 0.30	
32 weeks	1.41 (1.35)	2.56 (2.40)	6.71	< 0.04	
Proportion of participants with emergency room visits, mean (SD)					
Baseline	0.61 (0.36)	0.32 (0.34)			
10 weeks	0.29 (0.32)	0.19 (0.26)			
20 weeks	0.11 (0.20)	0.25 (0.31)	5.33	<0.06	
32 weeks	0.25 (0.30)	0.16 (0.25)	1.99	<0.16	
Proportion of participants hospitalized, mean (SD)					
Baseline	0.29 (0.31)	0.18 (0.21)			
10 weeks	0.04 (0.10)	0.0.18 (0.20)			
20 weeks	0.02 (0.07)	0.14 (0.18)	13.9	<0.001	
32 weeks	0.14 (0.20)	0.11 (0.16)	0.5	<0.48	
Normally distributed outcomes			Wald χ^2	P	Cohen's d
Borderline symptoms checklist (BSL), mean (SD)					
Baseline	56.35 (16.51)	58.75 (19.64)			0.32
10 weeks	45.03 (13.74)	53.61 (17.70)			
20 weeks	33.72 (18.70)	48.48 (22.21)	8.98	<0.01	
32 weeks	41.08 (22.41)	45.99 (26.27)	0.75	<0.77	
Anger (STAXI, Anger Expression Out Scale Score), Mean (SD)					
Baseline	38.73 (9.88)	45.22 (9.53)			0.8
10 weeks	34.23 (8.50)	43.20 (8.71)			
20 weeks	29.73 (9.27)	41.18 (10.68)	23	<0.001	
32 weeks	30.29 (10.96)	40.43 (12.16)	14.1	<0.001	
Symptom distress (SCL-90R, Total Score), mean (SD)					
Baseline	1.96 (0.59)	2.10 (0.68)			0.41
10 weeks	1.63 (0.54)	1.97 (0.64)			
20 weeks	1.30 (0.65)	1.84 (0.76)	10.3	<0.005	
32 weeks	1.47 (0.76)	1.69 (0.87)	1.33	<0.50	
Barratt Impulsiveness Scale-11 (BIS-11), Mean (SD)					
Baseline	57.82 (9.04)	55.83 (9.98)			0.08
10 weeks	55.31 (7.50)	56.02 (7.52)			
20 weeks	52.79 (9.72)	56.20 (8.54)	2.29	< 0.52	
32 weeks	53.32 (11.35)	55.16 (9.10)	0.57	< 0.90	
Social adjustment scale–self-report (SAS-SR), mean (SD)					
Baseline	2.84 (0.46)	2.84 (0.53)			0.45
10 weeks	2.67 (0.43)	2.92 (0.50)			
20 weeks	2.50 (0.56)	2.88 (0.59)	7.49	<0.02	
32 weeks	2.60 (0.70)	2.87 (0.65)	2.82	<0.19	
Depression (BDI), mean (SD)					
Baseline	32.68 (10.95)	36.70 (11.46)			0.32
10 weeks	27.72 (9.59)	33.21 (11.02)			
20 weeks	22.76 (12.55)	29.73 (13.50)	4.84	< 0.08	
32 weeks	27.94 (16.08)	29.50 (15.71)	0.24	< 0.62	
Difficulties in emotion regulation scale (DERS), mean (SD)					
Baseline	131.43 (17.84)	132.80 (16.79)			0.5
10 weeks	118.99 (15.55)	129.75 (15.76)			
20 weeks	106.55 (20.22)	126.70 (18.76)	18	<0.001	
32 weeks	110.63 (26.87)	128.06 (20.89)	9.11	<0.01	
Distress Tolerance Scale (DTS), Mean (SD)					
Baseline	5.11 (2.49)	4.45 (2.34)			0.56

Table 3. (Continued)

Normally distributed outcomes			Wald χ^2	*P*	Cohen's *d*
10 weeks	6.44 (2.16)	4.95 (1.87)			
20 weeks	7.77 (2.93)	5.45 (2.49)	12.5	<0.005	
32 weeks	7.81 (3.64)	5.28 (2.75)	11.1	<0.005	
Kentucky Inventory of Mindfulness Skills (KIMS), Mean (SD)					
Baseline	101.46 (19.21)	105.42 (15.51)			0.19
10 weeks	109.14 (15.57)	106.48 (14.87)			
20 weeks	116.81 (17.53)	107.53 (17.41)	4.65	<0.2	
32 weeks	114.6 (21.08)	107.76 (20.25)	1.91	<0.6	

**Means reported are the fixed-effect marginal mean incident rates after adjusting for overdispersion between and within participants. DHSI, Deliberate Self-harm Inventory; LSASI, Lifetime Suicide and Self-Injury Interview; BSL, Borderline Symptom Checklist; STAXI, State-Trait Anger Expression Inventory; SCL-90-R, Symptom Checklist 90-Revised; BIS-11, Barratt Impulsiveness Scale; SAS-SR, Social Adjustment Scale–Self Report; BDI-II, Beck Depression Inventory-II; DERS, Difficulties in Emotion Regulation Scale; DTS, Distress Tolerance Scale; KIMS, Kentucky Inventory of Mindfulness Skills.

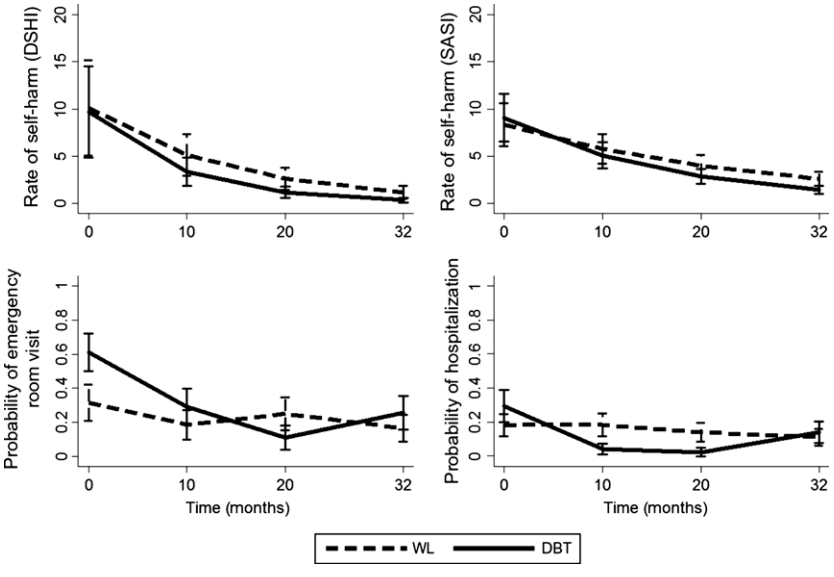

Fig. 2. Outcomes for dialectical behaviour therapy ($N = 42$) and waitlist ($N = 42$) groups over 32 weeks after randomization. Estimated marginal means and 95% confidence intervals over specific outcomes. DSHI, Deliberate Self-Harm Inventory; LSASI, Lifetime Suicide Attempt Self-Injury. Estimates of the marginal means were derived from multilevel generalized linear models. Estimates are incident rate ratios for the self-harm measures and probabilities for the occurrence of Emergency Room Visits and Hospitalizations.

and borderline symptoms at the end of treatment, at 32 weeks the gains on these outcomes either diminished or the waitlist participants had caught up.

The study findings lend support to the theory that the development of coping skills may be a critical ingredient in DBT that accounts for improvements on outcomes, an idea that is supported by one DBT study that found that coping skills mediate outcomes (39). Our findings highlight the benefits of DBT skills training and are in line with the results of a recent component analysis study by Linehan et al. (8), demonstrating the superiority of DBT with skills training vs. DBT without skills training for reducing self-harm behaviours, amongst individuals with at least one episode of self-harm during the year of treatment. Our findings extend knowledge about the effectiveness of DBT skills training by demonstrating that an abbreviated format of DBT is useful for reducing symptoms associated with the acute phase of BPD.

This study provides additional support for the effectiveness of abbreviated interventions for BPD. Our findings are consistent with those of other studies that demonstrate the effectiveness of brief skills-based group interventions (10, 11, 40). Research on interventions for individuals at high risk for suicide is lacking, and evidence of strategies that may be successful for patients with severe symptoms is needed.

Consistent with other studies in which brief skills training interventions of BPD are best described as an adjunct to other treatment, receipt of other treatments was unrestricted, and the majority of participants received some other form of ancillary treatments during the 32 weeks. It is not known how these other treatments impacted the effects of the skills training, and we cannot rule out the possibility that the effects that were observed are related to these confounds. However, utilization of other treatments did not differ between the groups, and

participants in the WL condition showed fewer improvements than did those in the DBT group, suggesting that the most plausible explanation is that the observed effects are attributable to the DBT intervention.

Our findings indicate that brief DBT skills training has its impact on the management of acute symptoms of BPD (e.g. self-destructive behaviour and anger), problems that frequently challenge healthcare professionals. Although the DBT group showed superior improvements on healthcare utilization and mental health symptoms (e.g. borderline symptoms, symptom distress and social adjustment) during the treatment period, these gains were not maintained postdischarge. While our findings contrast with evidence on standard DBT supporting the maintenance of treatment gains postdischarge (e.g. 8, 22, 41), they are consistent with other evidence showing that the effects of the skills-only component of DBT (8) is not durable on specific outcomes. Most of the DBT group still reported high levels of general symptom distress at 32 weeks, suggesting that brief DBT skills training is not a panacea for a severe patient population. However, it may be useful for addressing specific symptoms in individuals in the acute phase of this disorder. Our findings indicate that DBT skills training was sufficient for stabilizing high-risk behaviours and reducing the use of costly crisis services. Consequently, when long-term comprehensive treatment is not accessible, brief DBT skills training may be a reasonable intervention to recommend as a first step, although not as a replacement for comprehensive treatment.

Strengths of the present study include its well-powered, randomized design and its high ratings of treatment adherence. Some limitations need to be considered. First, the problem with an active WL control design is that there is no control over what the participants do while on the waitlist, such as seeking other forms of treatment. Additionally, the absence of a uniform therapeutic comparator group prevents us from answering questions about the unique effects of DBT skills. However, the design is justifiable in the absence of a therapeutic comparator group and an existing alternative best treatment. The study design can also be seen as a strength because the study more accurately mirrors the real world. Second, to maximize external validity, ancillary treatments were not excluded, so the possibility of confounds must be acknowledged. Third, the primary outcome of frequency of suicidal and NSSI behaviours was self-report (e.g. LSASI; DSHI) and may have been affected by responder bias. In addition, the psychometric properties of the LSASI are unknown. Finally, the follow-up was for only three months, which may not have been long enough to address questions about the durability of the treatment effects.

Future studies using controlled designs with active comparators are needed before strong conclusions can be drawn about the suitability of this brief intervention for all individuals with BPD. In addition, because variability in response is inevitable, studies are needed to identify the factors that moderate, mediate and predict differential treatment outcomes. However, these findings indicate that brief DBT skills training has benefits and is not harmful for suicidal individuals with BPD. This treatment option should be considered for this high-risk population, especially for those unable to access lengthy comprehensive specialist programmes.

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Declaration of interest

The authors report no conflict of interests in relationship to this study. The clinicaltrials.gov identifier for this study is NCT01193205, August 31, 2010.

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Supporting Information

Additional Supporting Information may be found in the online version of this article:

Fig. S1. Clinically relevant change, by group assignment, at 20 and 32 weeks after randomization[a].