Published in final edited form as:

Adm Policy Ment Health. 2015 July ; 42(4): 449–461. doi:10.1007/s10488-014-0588-7.

Does Insurance Matter? Implementing Dialectical Behavior Therapy with Two Groups of Youth Engaged in Deliberate Self-Harm

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Abstract

This paper presents the outcomes of a Dialectical Behavior Treatment (DBT) program, implemented in intensive outpatient care with two groups of adolescents (n=55 and n=45), ages 12–18, who engaged in deliberate self-harm (DSH) but had different insurance/funding sources and risk backgrounds. This pre-post study examined variability in clinical functioning and treatment utilization between the two groups and investigated moderating risk factors. Findings support DBT's effectiveness in improving clinical functioning for youth with DSH regardless of insurance type. However, lower rates of treatment completion among youth without private insurance call for extra engagement efforts to retain high-risk youth in DBT.

Keywords

deliberate self-harm; adolescents; DBT; insurance type; implementation

The significant numbers of adolescents who engage in deliberate self-harm (DSH) during their lifetime have been cause for concern in community and clinical settings. A history of self-injurious behaviors is one of the primary indicators for suicide (Hawton & Harriss, 2007), which in turn remains one of the leading causes of death among 15- to 24-year olds (CDC, n.d.). Since engagement in self-harming behaviors can lead to serious injury and even death, it is a common trigger for admission to inpatient psychiatric care (e.g., Zalsman, Levy & Shoval, 2008), an expensive and restrictive treatment option with a weak evidence base (Burns, Hoagwood & Mrazek, 1999). Finding effective treatments for adolescents engaged in deliberate self-harm has been identified as an important area of study (Ougrin, Tranah, Leigh, Taylor & Asarnow, 2012).

In this paper, we present the outcomes of a DBT program that was implemented in an intensive outpatient setting with two groups of youth who engaged in DSH but had different insurance/funding sources and related risk backgrounds.

An Overview of DSH among Adolescents

In the research literature, multiple terms are used to describe self-harm, which is defined as engagement in intentionally self-injurious behaviors such as cutting, scratching, punching, biting, ripping, carving and burning (Klonsky, 2007; Whitlock 2010). In the United States, a distinction is often made between self-harm with or without suicidal intent (e.g., non-suicidal self-injury [NSSI]). In this paper we will use the term deliberate self-harm (DSH), which is more commonly used in the UK and Europe and is more encompassing, describing “self-harm with suicidal intent, nonsuicidal self-harm and self-harm episodes with unclear intent” (Ougrin et al., 2012, p.337). Studies have only recently begun to empirically investigate different types of self-harm (e.g., Jacobson et al., 2008), and disparate conceptualizations and operationalizations render cross-study comparisons about the prevalence and correlates of self-harm difficult.

Not surprisingly, prevalence estimates of DSH in adolescent community samples are highly variable (Muehlenkamp, Claes, Havertape & Plener, 2012), ranging from 4% (Patton et al., 2007) to 42% (Cerutti, Manca, Presaghi & Gratz, 2011), depending on sampling method and assessment and classification systems for self-injury. For instance, single-item assessments of DSH have been found to yield significantly ($p<.03$) lower prevalence estimates (12.2%) than behavioral check-list surveys (31.4%), suggesting measurement bias (Muehlenkamp et al., 2012). Estimates also vary depending on the timeframe during which DSH is assessed, i.e. lifetime prevalence versus 6- or 12-month prevalence (Muehlenkamp et al., 2012). Youth in clinical settings have significantly higher rates of DSH than youth in community samples. Among those in inpatient psychiatric care, DSH rates as high as 60–80% have been reported (Nock & Prinstein, 2004).

Multiple studies have investigated risk factors or correlates of DSH and have implicated a range of sociodemographic and psychosocial factors (Boxer, 2010; Challis, Nielssen, Harris & Large, 2013; Evans, Hawton & Rodham, 2004; Gratz et al., 2012; Madge et al., 2011; Scoliers et al., 2009). For instance, being female (e.g., Gratz et al., 2012; Hawton & Harriss, 2008) and between the ages of 15–18 years old (Sourander et al., 2006) have been found to

increase the risk of DSH. Some studies have also documented racial/ethnic variation in self-harm (Cooper et al., 2010; Gratz et al., 2012) as well as higher prevalence rates of self-harm and suicidality in youth from more socio-economically deprived backgrounds (Gratz et al., 2012; King & Merchant, 2008). Mental health problems, in particular depression, borderline personality traits, impulsivity, problems with self-esteem and sexual identity issues, child abuse histories and poor familial and interpersonal relationships have all been found to be associated with adolescent DSH. Explanatory models for self-harm vary depending on the presence of suicidality or not (Jacobson, Muehlenkamp, Miller & Turner, 2008). Commonly cited functions of self-harm without suicidal intent include emotion regulation, expression and alleviation of psychological distress, and refocusing away from negative stimuli (Klonsky, 2007; Laye-Gindhu & Schonert-Reichl, 2005).

Treating youth engaged in DSH is challenging (Zila & Kiselica, 2001). First of all, much remains unknown about the different presentations of self-harm (with or without suicidality, suicidality without deliberate self-harm) and the implications for treatment (Jacobsen et al., 2008). Secondly, self-harm in all of its forms has been linked to higher rates of psychiatric disorders and engagement in other health-risking behaviors (Gould, Greenberg, Velting & Shaffer, 2003; Ogle & Clements, 2008), contributing to a complex clinical picture. Thirdly, only a fraction of youth engaged in DSH seek or receive help (Hawton, Rodham, Evans & Weatherall, 2002; Pages, Arvers, Hassler & Choquet, 2004). Findings from population-based studies indicate that 10–20% of youth engaged in DSH are hospitalized following an incident of self-harm, and less than one-fifth receives other types of health services (Hawton et al., 2002; Pages et al., 2004; Ystgaard et al., 2009). For those youth in treatment, the empirical evidence-base of available treatments remains limited (Ougrin et al., 2012). Studies have been conducted testing a range of treatment approaches, including pharmacotherapy, group therapy, systemic treatments, psychodynamic interventions and cognitive-behavioral approaches (Muehlenkamp, 2006; Ougrin et al., 2012). Independent replications of rigorously conducted trials with adolescents are urgently needed. There is evidence from the adult literature on suicidality and non-suicidal self-harm that behaviorally-based interventions that teach problem-solving and coping skills constitute an effective approach to reducing self-harm (Panos, Jackson, Hasan & Panos, 2014; Tarrier, Taylor & Gooding, 2008). Dialectical Behavior Therapy (DBT) is on the short list of treatments most promising in reducing self-harming behavior among adolescents (Muehlenkamp, 2006; Ougrin et al., 2012).

Dialectical Behavior Therapy (DBT)

DBT is a structured multi-component treatment involving psychotherapy, group skills training, phone consultation, and team-based therapist consultation (Linehan, 1993a). Steeped in cognitive-behavioral principles, dialectics, and mindfulness, DBT targets affective and behavioral dysregulation, and is considered effective in the treatment of borderline personality disorder and suicidality among adults, many with histories of self-harm (Linehan, Comtois, Brown, Heard, & Wagner, 2006). The intervention incorporates four modules: mindfulness, distress tolerance, emotion regulation, and interpersonal effectiveness (Linehan, 1993a). These modules are implemented through a series of skills,

which foster cognitive-behavioral change over the course of a one year long treatment (see Linehan, 1993b for a full review).

In addition to skills training, which is supported through weekly group and individual therapy, DBT effectiveness is rooted in creating a consistent system that supports behavioral change (Linehan, 1993a). While in treatment patients explore the presentation and function of their harmful behaviors, enabling them to identify, evaluate and modify their behavior over the course of treatment. Through this process patients complete diary cards, or weekly reports of their emotions, behaviors, and use of DBT skills to quantify their experiences and expose behaviors that interfere with treatment progress. DBT therapists are available to their clients outside of therapy sessions to provide support for using the skills during time of distress.

DBT has been adapted for adolescents (Miller, Rathus, & Linehan, 2006; Rathus & Miller, 2002). Treatment modifications in Adolescent DBT range from including family members in multifamily skills training groups, to adding specific adolescent skills such as “Walking the Middle Path,” and reducing treatment time from 1 year (standard DBT) to 16 weeks (Macpherson, Cheavens & Fristad, 2013). Evidence in the treatment of adolescents with a range of severe emotional problems is growing although findings to date, with rare exceptions, (Rathus & Miller, 2002) are mostly based on pre-post design studies (Fleischhaker et al., 2011; James, Taylor, Winmill, & Alfoadari, 2008; Woodberry & Popenoe, 2008). An NIMH-funded randomized clinical trial of DBT with multi-problem youth is currently underway (NIH Research Portfolio Online Reporting Tools [RePORT], n.d.). Overall findings of available outcome studies suggest decreased psychiatric hospitalization during treatment, reduction of suicidal ideation and general psychiatric symptoms, decreased episodes of deliberate self-harm and improved overall functioning following DBT (Macpherson et al., 2013).

Purpose of Study

While DBT is a promising treatment for self-harm, much remains to be learned about the types of youth for whom DBT may be effective. In this study, we compare the outcomes of a DBT program for two naturalistically occurring groups. The first group was privately insured and therefore had the requisite funding to receive intensive outpatient treatment. Foundation funding was acquired to extend treatment to youth with public insurance or those who based on family income level would have been eligible to receive public insurance. As stated above, some studies have reported variation in self-harming behaviors depending on socio-economic status (Gratz et al., 2012; King & Merchant, 2008), and there is evidence from multiple studies in the mental health disparities literature that youth with public or no insurance fare worse in terms of mental health services access (Burnett-Zeigler & Lyons, 2010; Valet, Kutny, Hickson & Cooper, 2004), retention (González, 2005; McKay, Stoewe, McCadam, & Gonzales, 1998), and outcomes (Lichtenstein, Sharma, & Wheat, 2005).

By facilitating equal access to DBT, thereby controlling for the potential effects of insurance or funding type, we are able to examine variability in clinical functioning and treatment

utilization between the two groups of youth while in the program and investigate other risk factors that moderate outcomes.

Methods

In 2008, a large psychiatric facility in the Southwest of the United States began implementing DBT as part of its intensive outpatient program. This effort was initiated for two reasons: (1) Schools and community providers referred growing numbers of self-harming youth to the facility; and (2) the facility increasingly focused on implementing interventions with an empirical evidence base. While the evidence-base for DBT with adolescents is still being developed, DBT had a comparably stronger evidence base in the treatment of self-harm than other treatments used at the facility. After requisite training was obtained (see below – DBT Training and Procedures – for more detail on training), the intervention began to be implemented. Foundation funding was acquired to support access to the program for public insurance or public insurance-eligible children who otherwise would not have been able to receive intensive outpatient treatment.

Enrollment of Treatment Participants

Patients were referred to the program through behavioral health departments, private therapists, and self-referral. To be eligible for participation, youth had to be between 12–18 years old, have a current or recent (within the last 12-month) history of self-injurious behaviors with or without suicidality as indicated by clinical assessment, and be willing to participate in all program components along with their parents/guardians. As the initial focus of this project was the implementation of DBT with self-harming youth, no standardized measure of the severity, frequency or methods of self-harm was introduced at this stage. However, clinical assessment indicated that self-harm varied considerably in frequency, severity and methods. Severity ranged from non-lethal (e.g., fingernail scratching of skin tissue) to potentially lethal (e.g., knife injuries on limbs which required a visit to the ER and subsequent stapling of the injuries). Frequency was at minimum once per week to a few times per day, and duration of engagement in self-harm varied as well. Methods of self-harm included virtually every form of self-injury recorded in the literature. Most common was some form of cutting with razors, although other forms included fingernail scratching, burning with salt and ice, eraser burns, scalding self with hot water, shocking oneself, intentionally walking through thorn bushes, punching walls, hitting oneself, triggering a cat to bite or scratch limbs, etc.

Within three years, 154 youth had enrolled in the program. The current study reports on 99 youth with complete pretest-posttest Youth Outcome Questionnaire data, the main outcome measure. Partial data (either pre- or post) were available for 36 youth (23.3%); 12.3% had all data missing. Analysis of missing data indicated that the analytic sample of 99 did not differ from the eligible sample of 154 on any key characteristics, including funding type (our main variable of interest), except with regard to reason for discharge. Cases with no or missing clinical data were more likely to have withdrawn prematurely from the program (54.1% versus 45.9%; $\chi^2=14.87$, $df=1$, $p<.05$).

Analyses presented here are based on the intent-to-treat sample. The institution's Institutional Review Board approved analysis of de-identified data that had been collected and maintained as part of quality assurance.

DBT Training and Procedures

The program is based on Miller's DBT for adolescents (Miller et al., 2006). Patients attended treatment twice a week for 16 weeks or until medical necessity for intensive outpatient care had ceased. Medical necessity connotes a regulatory concept specifying that payment for medical treatment will not occur unless it is considered to be reasonable and necessary for a given diagnosis (Jensen, 2006). Within the context of intensive outpatient care, patients generally cannot be an imminent danger to self or others (which would justify hospitalization) but need to have sufficiently severe symptoms to require an intensity of treatment that goes beyond regular once-a-week outpatient care. This determination is made through clinical assessment. Generally speaking, goals of the program include stabilization and behavioral control, decreasing life-threatening suicidal behaviors, therapy- and quality of life-interfering behaviors and increasing behavioral skills, which are the aims of Stage 1 of traditional DBT and have generally been described as the goals of Adolescent DBT (Blennerhasset & O'Raghallaigh, 2005; Linehan, 1993b). Treatment consisted of two 3-hour group therapy sessions and weekly individual and/or family therapy lasting 30–60 minutes. Group therapy included 90 minutes of peer group followed by 90 minutes of a multi-family skills training group. Parents attended a weekly hour-long parent education group.

Treatment was provided by a team of DBT-trained clinicians. Most staff received the gold standard two-week intensive training through Behavioral Tech (www.behavioraltech.org), Marsha Linehan's DBT training institute. In addition to the intensive training, the lead therapist received an additional week of training from a Behavioral Tech approved training series. The team of clinicians included a board certified psychiatrist, a licensed psychologist, licensed marriage and family therapists, licensed clinical social workers, and pre-licensed staff and students in the disciplines of psychology, social work, marriage and family therapy, and professional counseling. Pre-licensed staff received training and supervision from the intensively trained licensed staff during formal weekly sessions and as needed throughout the week. Therapists received DBT training once they became part of the program, so selection of therapists for the DBT program was guided by demonstrated interest in self-injury and a willingness to learn and implement DBT.

To increase fit with the service setting several modifications had to be made during implementation. The program was delivered as part of the intensive outpatient program, which falls under a number of regulatory requirements, including services being provided primarily in a group setting for a minimum of three hours at a time, two to three days per week. Regulatory requirements about medical necessity further governed the length of stay, limiting the ability to implement a long-term program, as in traditional, comprehensive DBT. Negotiations with managed care companies allowed for a program that lasted two rather than three days a week for altogether 16 weeks to be more similar to traditional DBT. This translated to 32 treatment sessions, which was roughly equivalent to the skills modules in Miller's model.

As three hours of group time are very intensive, especially for emotionally dysregulated adolescents, the time was broken up into peer group and multifamily time during every session. Peer groups focused on reinforcing and generalizing skill use for the adolescents. During multifamily groups youth and their caregivers were taught the skills together. In traditional DBT, one to two weeks of mindfulness training are provided followed by several weeks of a particular module (e.g., interpersonal effectiveness), after which mindfulness would be reviewed and the next module addressed. Additionally, in traditional DBT, groups are either closed to new members, or new members are admitted during the mindfulness time. Due to the nature of the setting, new patients had to be admitted continuously, which meant that the sequencing of modules varied depending on when a family entered the program. Modules were rotated on a weekly basis so that a family would receive some skills from each module on a monthly basis. The parent education groups are standard in the site's other intensive outpatient programs and are the source of particular approval from managed care companies, making them a practical necessity. Parent education groups were focused on teaching, reinforcing and generalizing DBT skills in a parental context. We were unable to implement telephone coaching due to institutional policies around employees being on call. However, in Year 5 of the program telephone coaching has begun to be piloted.

Variables and Measures

Outcome variables—Outcomes are reported for clinical functioning and treatment utilization.

Clinical functioning: The Youth Outcome Questionnaire-Self-Report 2.0 (Y-OQ-SR), (Wells, Burlingame, & Rose, 2003) a 64-item measure for adolescents ages 12–18 receiving mental health treatment, was used to measure clinical functioning. The Y-OQ-SR is not a diagnostic tool, but measures improvement in functioning over the course of treatment. Youth self-report on beliefs, attitudes, feelings, moods, and behaviors during the previous 7-day period using a 5-point Likert scale (0–4). The measure consists of six subscale scores (Intrapersonal Distress, Somatic, Interpersonal Relations, Critical Items, Social Problems, and Behavioral Dysfunction) and a summative (Total) score. The Total Score reflects a patient's overall level of psychological distress. The clinical cutoff is 46, which distinguishes between individuals in the clinical and non-clinical range. A Reliable Change Index (RCI) of 18 connotes clinically significant change.

The Y-OQ-SR includes one item that addresses both suicidal and non-suicidal self-harm (Item 21. "I have hurt myself on purpose, e.g., cutting or scratching self, attempting suicide). This item was examined separately as an indicator of self-harm.

The Y-OQ-SR takes 8 to 10 minutes to administer, is sensitive to change over short periods of time, and has sound psychometric properties with internal consistency for both clinical and community samples reported at $\alpha=.96$, and test-retest reliability at $r=.89$ for the total score and $r=.73$ to $.91$ for the subscales (Ridge, Warren, Burlingame, Wells, & Tumblin, 2009). While collected on a weekly basis, this analysis only reports on changes between pretest (collected in either week 1 or 2 of treatment) and posttest (last available score prior to discharge; had to be obtained at minimum during the last four sessions of treatment).

The parent version of the Youth Outcome Questionnaire (Y-OQ 2.01; Burlingame, Wells, Lambert, & Cox, 2004) was also administered. The Y-OQ 2.01 is a 64-item parent or guardian report for youth ages 4–17, and it is similar to the Y-OQ 2.0 SR in the type of subscales available, its ability to measure change metrics, and its normative score range (community = –16 to 46; clinical = 47 to 240). However, the Y-OQ 2.01 has an RCI of 13, which is five points lower than the RCI on the Y-OQ 2.0 SR. The Y-OQ 2.01 has been used more extensively in outpatient care settings for a greater period of time than the adolescent self-report version (McClendon et al., 2011).

Treatment utilization: Two variables captured this outcome: (1) Psychiatric hospitalization while in DBT (yes/no); (2) Discharge reason from DBT (1=graduated; 2=withdrew).

Graduation was defined as youth who successfully completed the program. This generally meant completing the 16-week/32-session program. However, therapists had discretion in consideration of medical necessity requirements to slightly extend or shorten treatment to support individual treatment goals. For patient graduates in our sample, a total of 5 (7%) had less than the standard 32 sessions recommended while 10 (14%) had more.

Between-group factor—Funding type was the between-group factor (1=private insurance; 2=grant-funded).

Other variables/covariates—For purposes of describing the sample and to adjust for possible baseline differences between the two groups of interests, the following variables were used.

Demographic information: Information was available on gender (1=male, 2=female), age (continuous), ethnicity (1=Caucasian, 2=African American, 3=Hispanic, 4=other) and sexual orientation (1=heterosexual, 2=LGBT).

Clinical data: Information on current substance use, which was obtained as part of the initial clinical assessment, was operationalized as a dichotomous variable (1=yes; 2=no). It should be noted that 92% of youth had a primary diagnosis of major depression, therefore, diagnosis was not used in the analysis. We also did not use GAF scores as in real-world service settings these scores are highly vulnerable to thresholds set by insurance companies to ensure continued services.

Risk factors: To capture risk factors in the youths' background, we relied on indicators that had been recorded as part of youth's initial clinical assessment and have been reported in the literature as psychosocial risk factors or correlates of adolescent depression, self-harm, and/or suicidality. Data, dichotomously reported (yes/no), were available on (1) abuse violence history (Gratz, 2006); (2) history of abandonment (Timmons, Selby, Lewinsohn & Joiner, 2011); (3) adoption (Slap, Goodman & Huang, 2001); (4) academic functioning below average/failing (Verboom, Slijtsema, Verhulst, Penninx & Ormel, 2014); (5) family history of mental illness and/or drug abuse (Ping, Agerbo & Mortensen, 2002); (6) head trauma/seizures (Jackson & Turkington, 2005). A summative score (0–6) was calculated as a gross indicator of psychosocial risk (James et al., 2010).

Service history: Youth service history included (1) prior psychiatric hospitalizations (1=yes; 2=no), (2) number of episodes in psychiatric hospitals, and (3) number of days in psychiatric hospitals.

A more comprehensive standardized pre-post assessment battery, measuring outcomes in multiple biopsychosocial domains (e.g., parenting relationship, executive functioning, behavior problems), was added in Year 3. However, given the small sample size for these measures to date analyses presented here will focus only on clinical functioning.

Data Analysis

Descriptive statistics were generated for the intent-to-treat sample of 99. *t*-tests and *chi*-square tests were applied to detect differences on key characteristics between privately-insured and grant-funded youth. Parametric assumptions were assessed and determined to be acceptable with regard to outliers, normality and homogeneity of variance. A mixed between-within factorial ANOVA was carried out to examine main and interaction effects of funding type on changes between pre- and posttest clinical functioning scores. Variables that significantly distinguished between the two funding types in bivariate analyses or were otherwise conceptually compelling were subsequently included as covariates in the model. Main and interaction effects as well as effect sizes are reported. Eta squared (η^2) is the most commonly used index for factorial ANOVA designs where 0.04 constitutes the recommended minimum effect size, 0.25 a moderate effect and 0.64 a large effect (Ferguson, 2009). Tests were run separately for all subscales due to sample size considerations. All analyses were performed with IBM SPSS 20.0.¹

Results

Sample Characteristics

Table 1 shows the characteristics of the 99 youth in the analytic sample – 54 in the private insurance group and 45 in the grant-funded group. The vast majority of youth were female. The average age was 14.9 (SD=1.3). Almost 59% of the youth were white, 14.1% African American, 21.2% Hispanic and 6.1% Asian or other. Due to cell size concerns the race/ethnicity variable was subsequently collapsed into two categories – white and other. The two groups showed statistically significant differences with regard to race/ethnicity, with the grant-funded youth having a significantly higher percentage of minority youth (53.3% versus 31.5%; $p<.05$), and risk factor score where grant-funded youth had a risk factor score of 2.7 versus 2.2 for the private insurance youth (range 0–6; $p<.05$).

Baseline Clinical Functioning

While clinical functioning data were collected from youth and parent, data inspection indicated much missing parent data, with complete data for only 68 of the 99 youth in the analytic sample. The parent-report sample also had a higher rate of white parents (66.2% vs. 58.6%) and a higher rate of youth who completed the treatment successfully (79.4% vs.

¹We also analyzed clinical functioning trajectories using hierarchical linear modeling. Since HLM analysis did not detect variability in the slopes by key covariates, but only differences in the intercepts thereby confirming results presented here, we opted to use the analysis of variance approach to capture pre-post differences in outcome.

71.7%). While analyses were subsequently conducted separately on both parent and youth samples differences in sample characteristics prevent a straight comparison of youth- and parent-report findings. Findings generally converged, but results presented here will reflect youth-report scores for the sample of 99 unless otherwise indicated.

The mean pretest Y-OQ-SR Total Score was 82.55 (SD=36.49), well above the clinical cutoff. Differences in pretest mean scores across all scales were not statistically significant except in the area of Interpersonal Relations where grant-funded youth had slightly elevated scores compared to private insurance youth ($t(97)=2.13$; $p<.05$). With regard to self-reported DSH at baseline, 22.2% of youth reported self-injuring “almost always or always,” 16.2% “frequently,” 29.3% “sometimes,” 10.1% “rarely,” and 22.2% “never or almost never.” These rates converged with parent-reported DSH except that fewer parents (10.4%) reported self-injury “almost always or always.” Instead they were more likely (26.5%) to indicate that youth self-injured “frequently.” No differences were found by funding type.

Pretest-Posttest Changes in Clinical Functioning by Funding Type

A mixed between-within factorial ANOVA examined changes in clinical functioning between pretest and posttest (within-subjects factor) by funding type (between-subjects factor). Table 2 shows descriptive results for pretest and posttest scores for the two funding types, and includes F -tests, eta squared (η), and p values for the main effects of Time and Funding Type as well as interaction effects for Time x Funding Type. Findings indicate statistically significant main effects for Time on all subscales. For Total Score, the mean change score was 27.65 (SD=1.08), exceeding the Reliable Change Index of 18, which would indicate clinically significant change. However, on average posttests were still above the clinical cutoff of 46. Effect sizes were moderate for Total Score ($\eta^2=.31$), Intrapersonal Distress ($\eta^2=.27$), Critical Items ($\eta^2=.29$), and Item 21 ($\eta^2=.42$). For all other subscales, effect sizes were small. Funding type did not moderate changes in clinical functioning. In contrast to youth self-report scores, there was a statistically significant Time x Funding Type interaction with regard to the parent report behavior problems subscale with private insurance parents reporting significantly greater improvement in this area compared to grant-funded parents; $F(2,66)=5.30$, $p<.05$. No notable main effects for funding type were found in any analyses.²

Treatment Utilization

There were no differences between funding types with regard to psychiatric hospitalization while in DBT treatment. Twenty-six percent were psychiatrically hospitalized. Of these youth, all but six had one episode; the remaining experienced two stays. Differences in the percentage of treatment completers (Discharge Reason) approached statistical difference, $\chi^2(1)=3.67$, $p=.056$. Close to 80% of youth with private insurance graduated from the program whereas 62.2% did in the grant-funded group. Since a greater percentage of youth who had withdrawn from the program prematurely also had missing clinical data (see earlier discussion under Enrollment of Treatment Participants), we further examined the

²There was a negligible effect of funding type on Interpersonal Relations; however, baseline differences had previously been determined between privately funded and grant-funded youth. Subsequent linear regression with this variable, using the posttest score as the DV and controlling for pretest score indicated no effect of funding.

relationship between Discharge Reason and Funding Type for the larger sample of 154 youth, and found the relationship to be even stronger and statistically significant ($\chi^2(1)=11.98, p<.001$), justifying inclusion of this variable as a covariate in subsequent analyses.

Covariate Effects

We tested the moderating effect of the two covariates, for which significant differences by funding type had been found: Race/ethnicity ($\chi^2(1)=4.83; p=.028$), and Risk Factor Score ($t(1)=2.17; p=.032$). We also included Discharge Reason for reasons described in the prior paragraph. Neither Race/ethnicity, Risk Factor Index nor Funding Type had significant main or interaction effects in this model. Main effects for Time could now only be found for Total Score, $F(5,94)=6.12, p<.05$; Interpersonal Relations, $F(5,94)=3.93, p<.05$, and Intrapersonal Distress, $F(5,94)=5.72, p<.05$. There were also main effects for Discharge Reason with regard to Total Score, $F(5,94)=6.85, p<.01$; Interpersonal Relations, $F(5,94)=11.78, p<.01$; Social Problems, $F(5,94)=6.48, p<.05$; and Behavioral Dysfunction, $F(5,94)=4.87, p<.05$. In these areas, graduated youth had significantly lower pretest and posttest scores than youth who withdrew prematurely from the program. However, overall effect sizes were small. There were also significant interaction effects for Discharge Reason x Time with regard to Total Score, $F(5,94)=4.82, p<.05$; and Intrapersonal Distress, $F(5,94)=4.73, p<.05$. Youth who graduated experienced an average change score of 33.48 ($SD=41.56$) whereas youth who withdrew prematurely from the program had a mean change score of 12.86 ($SD=38.04$). The trend was the same for the Intrapersonal Distress subscale, and approached statistical significance in the area of Interpersonal Relations.

Additional Analyses

Given differences in graduation rates by funding type, we conducted additional analyses on treatment completers ($n=71$) (not shown). Trends described above and shown in Table 2 were confirmed and amplified. Effect sizes for main effects of Time increased, and as before, no main effects of Funding Type or interaction effects of Time x Funding Type were found.

Discussion

Adolescent self-harm has been described as difficult to treat (Muehlenkamp, 2006) and even as a set of behaviors resistant to treatment (Zila & Kiselica, 2001). The potential for serious and perhaps fatal self-injurious behaviors, whether intended or not, prompts many therapists and families to hospitalize youth - an expensive option that is not reliably effective in the treatment of self-harm or suicidal acts (Linehan, 2000). Since self-harm is used by many youth as a form of emotional self-regulation, it is a behavior that can be inadvertently maintained through positive and negative reinforcers. For the same reason, carefully implemented cognitive-behavioral strategies seem to be effective in reducing engagement in DSH. DBT is considered one of the promising treatments for youth engaged in self-harming behaviors (Miller, Rathus, Linehan, Wetzler, & Leigh, 1997; Muehlenkamp, 2006).

As such, this study, which has a comparably large sample size, contributes in part to the limited body of pretest-posttest studies supporting DBT's promise in improving overall clinical functioning in adolescents with DSH within the context of intensive outpatient care. Within an average treatment period of a little more than three months, youth showed statistically significant improvement across all domains of functioning captured by the Youth Outcome Questionnaire. Treatment completers who stayed in the program for the full four months displayed an even greater reduction in problematic behaviors. DBT was further effective in reducing the rate of self-reported self-injury, thus converging with findings from the limited number of studies previously conducted in this area (Miller, Wyman, Huppert, Glassman, & Rathus, 2000; Rathus & Miller, 2002). Overall, improvement was deemed clinically significant. However, posttest scores remained above the clinical cutoff, suggesting that a longer treatment period or less intensive post-treatment DBT may be indicated. Miller and colleagues (2007) have previously outlined the use of peer-led graduate groups following DBT to aid in the consolidation of skills.

The primary focus of this paper was, however, on investigating differences in outcome by funding type. Relatively little is known to date about factors that may moderate DBT treatment success for DSH youth (Perseus, Öjehagen, Ekdahl, Åsberg, & Samuelsson, 2003; Shearin & Linehan, 1992). The effect of funding type was examined due to documented variation in DSH among different socio-economic groups (e.g., Gratz et al., 2012) and findings from some studies in the mental health care disparities literature, suggesting that insurance type influences treatment access, utilization, and outcomes (Fry-Johnson et al., 2005; Lichtenstein et al., 2005). This naturalistic study offered the opportunity to examine outcomes for two groups of youth participating in the same program but under different funding types. About half of the youth in our sample would not have had access to DBT at the index facility unless their participation in the program had been paid through a specially acquired private foundation grant, which aimed to make best practices available to needy youth who were without the requisite insurance. Grant-funded youth were on Medicaid or were eligible for Medicaid based on their families' income level. Not surprisingly, treatment utilization is often affected by insurance type since having certain types of insurances determines in part access to particular types of treatments. This program controlled for funding type by providing equal access to all youth meeting clinical eligibility criteria. Therefore, unless other moderating factors are at play, one would expect equal outcomes for both groups. This was indeed confirmed. Regardless of funding type, youth reported significant improvement in clinical functioning between pretest and posttest across all measured domains, including self-reported self-injury. We also did not find differences with regard to admission to inpatient psychiatric care while in the DBT program. Findings thus suggest that youth from higher risk backgrounds can similarly benefit from DBT if given equal access to the treatment.

However, study findings also suggest that youth who were in the grant-funded group were at higher risk for not completing treatment. When testing the moderating effect of Discharge Reason (i.e., graduation versus withdrawal), main effects for time (capturing changes between pretest and posttest) disappeared in four subscales (Somatic Subscale, Social Problems, Behavioral Dysfunction and Critical Items), and were visibly reduced in the remaining areas (Total Score, Interpersonal Relations, Intrapersonal Distress, and Item 21/

Self-injury). Discharge Reason also had main effects in several areas. Follow-up analyses on treatment completers showed amplification of results previously obtained for the intent-to-treat sample. Main effects for time were stronger, and covariates had a lessened impact. While these findings have to be treated with caution given bias related to the exclusion of missing data which included a higher percentage of non-completers, it is likely that effects in the determined direction would be even stronger had we had clinical data for all 154 youth who enrolled during the three years. In future analyses, multilevel modeling will be useful in not only examining trajectories of clinical during the course of treatment but to also address missing data. These preliminary findings related to treatment completion are not surprising, yet they underscore the importance and promise of success when completing treatment. They also demonstrate the vulnerability of the grant-funded group for withdrawing prematurely from DBT.

Reasons for premature withdrawal from this treatment program are unknown at this point. The literature demonstrates a high degree of non-responsiveness to CBT-based treatments among adolescents (Weisz, McCarty, & Valeri, 2006). There is also a sizable body of literature chronicling problems in engaging low-income youth and families referred for mental health treatment (McKay & Bannon, 2004). Low response and high attrition rates have prompted calls to examine mediators and moderators of effective mental health treatments (Weisz et al., 2006). The limited number of studies in this area along with work conducted on treatment engagement of youth and families receiving community-based mental health services show that a range of factors, involving youth clinical and nonclinical characteristics (Burns, Cortell, & Wagner, 2008; Garland et al., 2005), parental characteristics, perceptions and behaviors (Bannon & McKay, 2005; Brannan, Heflinger, & Foster, 2003) as well as sociocultural factors, such as poverty and stigma (Johnson, Mellor, & Brann, 2008) affect treatment engagement and continuity (Gopalan et al., 2010). Informal data from follow-up interviews with youth and families in our program suggest that transportation (e.g., long distances, gas prices) constituted a considerable challenge for many families. However, the identification of primary contributors to early withdrawal from this DBT program will need to be further investigated. Besides being at greater risk for early withdrawal from treatment, the grant-funded group had a substantially higher percentage of minority youth who also presented with an elevated risk factor score compared to private insurance youth. However, neither risk factor score nor race/ethnicity were statistically related to reason for discharge.

Limitations and Strengths

This was a naturalistic study with all its accompanying limitations. First, the overall effectiveness of DBT cannot be determined with certainty given the study's pre-experimental design. However, for purposes of investigating the question of interest we were able to compare DBT's effectiveness for two naturalistically derived groups. The two groups - grant-funded youth and private insurance youth - were similar on most variables, and in the three areas where differences were determined, statistical adjustment occurred, yielding two relatively comparable groups.

Secondly, given the “real life” nature of the data, the size of the sample used in these analyses was affected by missing data. While sensitivity analyses determined no differences between the eligible and analytic samples on almost all key variables, the higher rate of non-completers among youth who were not included in the analytic sample introduced bias and prompts a cautionary note about findings related to treatment completion. Missing data also affected the utility of parent-report clinical functioning scores.

Thirdly, the lack of comprehensive measures in several areas is a weakness in this early work. For instance, determination of clinical eligibility for DBT treatment was based on clinical judgment by trained clinicians about recent and/or current occurrences of DSH, not based on standardized assessment. While this is an area of needed attention for our program, it should be noted that many studies continue using single-item assessments of self-harm and that variability in the assessment of self-harm continues to be matter of much debate in the field (Jacobson et al., 2012). Standardized assessment should also include symptom severity inventories and provide detailed diagnostic information. Relatedly, indicators of risk were weak and incomplete as we had to rely on data collected as part of the clinical assessment process. Future studies should also expand the range of outcomes.

Finally, while the program followed Miller’s adolescent version of DBT, some adaptations were made to facilitate implementation of the program into the intensive outpatient treatment setting likely affecting fidelity. Efforts have since been made to achieve fidelity of the model (e.g., piloting of coaching calls). Future work needs to focus on formally measuring treatment fidelity in accordance with DBT guidelines (Linehan, 1993b).

Despite these limitations, multiple strengths need to be noted. We were able to evaluate treatment effects for a comparably large sample of youth in DBT. The facility, which has a long and rich clinical and teaching tradition succeeded in implementing a new and complex treatment while administering a standardized protocol to evaluate its outcomes. By doing so, it responded to a community need while extending treatment to a group of high-risk adolescent patients who would have been unable to otherwise receive this treatment.

Conclusion

Results from this evaluation are encouraging, supporting DBT’s effectiveness in improving clinical functioning for youth engaged in self-harm regardless of insurance type. Findings further suggest the need for efforts that will keep youth and their families engaged in treatment to prevent early withdrawal, and to examine determinants of treatment success, specific to DBT. The DBT program at the index site has experienced relative stability and growth since its inception while continuing to wrestle with issues of implementation in the face of real-world constraints. The prevalence of DSH among adolescents and communities’ struggles to effectively respond to this problem provide great urgency for the implementation of effective treatments for DSH. However, much more remains to be learned about how to implement DBT into community mental health settings. DBT is a complex intervention with multiple salient treatment elements. While the need for more rigorous study designs is not questioned, findings from naturalistic studies, such as this, can be helpful in shaping the practice and research agenda for DBT.

Acknowledgments

This work was funded in part by NIMH K01 MH077732-01A1 (PI: S. James) and UniHealth Foundation. It was also supported by the National Institute of Health Disparities and Minority Health of the National Institutes of Health under award number P20MD006988.

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Table 1

Sample Characteristics by Insurance Status (N=99)

	Private Insurance n (%) or M (SD)	Grant-Funded n (%) or M (SD)	Statistics χ^2 or t	Significance p
Gender			.010	.918
Male	8 (14.8)	7 (15.6)		
Female	46 (85.2)	38 (84.4)		
Age	14.9 (1.3)	14.8 (1.4)	-.479	.633
Ethnicity			4.831	.028*
Caucasian	37 (68.5)	21 (46.7)		
Other	17 (31.5)	24 (53.3)		
Sexual orientation			.029	.865
Heterosexual	40 (80.0)	35 (81.4)		
LGBT	10 (20.0)	8 (18.6)		
GAF at discharge	51.8 (11.7)	49.8 (10.6)	-.907	.366
Current substance use			.005	.946
Yes	10 (19.6)	8 (19.0)		
No	41 (80.4)	34 (81.0)		
Risk factor score (0–6)	2.2 (1.1)	2.7 (1.2)	2.171	.032*
Prior psych. hospitalization			.132	.717
Yes	39 (72.2)	31 (68.9)		
No	15 (27.8)	14 (31.1)		
Previous no. of times psych. hospitalized	1.5 (1.6)	1.1 (1.1)	-1.243	.217
Average number of days previously psych. hosp.	4.2 (3.6)	4.9 (4.1)	.983	.328

Note.

*
 $p < .05$

Table 2
Mixed Between-Within Factorial ANOVA – Changes in Clinical Functioning by Funding Type (N=99)

	Private Insurance (n=54)			Grant-Funded (n=45)		
	Pre-test Mean	Post-test Mean		Pre-test Mean	Post-test Mean	
Total Score	80.20 (32.73)	50.39 (29.96)	60.31 (40.70)	85.36 (40.74)	60.31 (40.70)	42.657*** .323
Interpersonal Relations	5.59 (6.28)	2.52 (6.21)	4.82 (7.52)	8.27 (6.14)	4.82 (7.52)	.305 .016 17.777*** 5.428* [†] .057
Intrapersonal Distress	30.91 (12.07)	20.15 (11.39)	23.18 (16.01)	31.93 (16.59)	23.18 (16.01)	.154 .052 35.452*** .777 .000 .374
Somatic Subscale	9.98 (5.44)	7.13 (4.79)	8.56 (5.67)	10.58 (5.86)	8.56 (5.67)	.267 .007 15.792*** 1.241 .458
Social Problems	4.78 (5.43)	2.02 (3.12)	3.82 (4.10)	5.89 (5.79)	3.82 (4.10)	.139 .175 20.685*** 3.425 .004 .426
Behavioral Dysfunction	15.24 (7.07)	11.09 (6.48)	11.29 (7.38)	14.58 (11.29)	11.29 (7.38)	19.521*** .038 .003 .261
Critical Items	12.39 (6.77)	7.48 (5.50)	8.64 (6.81)	12.64 (7.56)	8.64 (6.81)	39.615*** .386 .004 .411
Item 21 – Self-Injury	1.94 (2.05)	.43 (.82)	.88 (1.14)	2.19 (1.31)	.88 (1.14)	.289 .004 68.831*** 3.330 ^c .003 .373 .002

Note:

* $p < .05$,

*** $p < .001$

[†] Significance due to baseline difference;

[‡] Eta-squared: .04 – recommended minimum effect size; .25 – moderate effect; .64 – strong effect;

^c approached statistical significance at $p < .08$

Table 3

Mixed Between-Within Factorial ANCOVA (N=99)

	Time F/η^2 ^a	Funding Type F/η^2	D/c Reason F/η^2	RFI F/η^2	Race F/η^2	Time x Funding F/η^2	Time x D/c Reason F/η^2	Time x RFI F/η^2	Time x Race F/η^2
Total Score	6.116*	.389	6.845**	.139	.865	.047	4.820*	.001	.186
	.058	.004	.067	.001	.008	.000	.049	.000	.002
Interpersonal Relations ^b	3.928*	2.203	11.783**	.585	.001	.284	3.633 ^c	.139	.024
	.039	.020	.109	.005	.000	.003	.036	.001	.000
Intrapersonal Distress	5.720*	.444	3.079 ^c	1.921	.399	.067	4.731*	.075	.067
	.055	.004	.031	.019	.004	.001	.045	.001	.000
Somatic Subscale	1.230	.199	5.039*	.031	.583	.277	.721	.230	.528
	.013	.002	.050	.000	.006	.003	.007	.002	.005
Social Problems	3.109	.702	6.482*	3.240 ^c	.269	.164	1.588	.596	.389
	.031	.007	.062	.031	.003	.002	.016	.006	.004
Behavioral Dysfunction	1.118	1.043	4.873*	1.107	1.065	.201	1.117	.014	.819
	.011	.010	.048	.010	.010	.002	.011	.000	.008
Critical Items	2.174	.053	3.270 ^c	1.275	1.534	.371	2.201	.214	.771
	.022	.001	.032	.013	.015	.004	.022	.002	.008
Item 21 – Self-Injury	3.570 ^c	3.638 ^c	1.759	.944	1.285	.323	.385	.398	.012
	.037	.037	.018	.010	.013	.002	.022	.004	.000

Note:

* $p < .05$,

 $p < .001$;^a Eta-squared: .04 – recommended minimum effect size; .25 – moderate effect; .64 – strong effect;^b Small pretest difference by funding type;^c approaches statistical significance $p < .08$