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ORIGINAL PAPER

Examining DBT Day Treatment in Treating Mood Dysregulation Expectancy and Anxiety in Women Diagnosed with Eating Disorders

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Abstract

Eating disorders (EDs), particularly anorexia nervosa (AN) and bulimia nervosa (BN), are characterized by emotional and behavioral disturbances in eating patterns and body image that result in significant distress and functional impairment (as reported by APA, (APA dictionary of psychology, American Psychological Association, Washington, DC, 2015)). Ben-Porath and colleagues (Journal of Contemporary Psychotherapy 40:115-123, 2010) have researched the effectiveness of dialectical behavioral therapy (DBT) day treatment program in reducing negative mood regulation and anxiety among women diagnosed with AN, BN, and eating disorder not otherwise specified (EDNOS). The current study extended past research on the effectiveness of DBT day treatment by analyzing the improvement in these patients' scores on the beck anxiety inventory (BAI) and the generalized expectancy for negative mood regulation (NMR) Scale after treatment. We compared pre- and post-treatment scores using paired samples t-tests. We also examined rates of clinically significant change in these areas post-treatment. The results indicated that participants demonstrated a reduction in expectancies for negative mood dysregulation and anxiety after undergoing DBT day treatment for EDs. Limitations and implications of this study are discussed.

Keywords Eating disorders · Mood regulation expectancy · Anxiety · Day treatment

Eating disorders (EDs) are marked by emotional and behavioral disturbances in eating patterns and body image, resulting in significant distress and functional impairment (APA 2015). Anorexia nervosa (AN) is an ED characterized by persistent refusal of food, excessive fear of weight gain, refusal to maintain a minimally normal body weight, and a distorted perception of body image (APA 2015). Bulimia nervosa (BN) is an ED distinguished by recurrent episodes of binge eating (periods of uncontrolled consumption of a large quantity of food) followed by inappropriate compensatory behaviors, such as self-induced vomiting, compulsive exercise, etc. (APA 2015).

Several studies have found that both the lifetime and 12 month prevalence of AN and BN is higher among women (Hudson et al. 2013; Nagl et al.2016; Udo and Grilo 2018). Udo and Grilo (2018) examined a sample of 36,306 US adults and found that 1.4% of women had a lifetime prevalence of AN and 0.5% had a lifetime prevalence of BN. Women diagnosed with an ED commonly experience medical complications resulting from significant weight loss and subsequent malnutrition and compensatory behaviors (Westmoreland et al. 2016). ED patients have also been found to experience greater difficulty in emotional regulation than individuals who do not have an ED (Brockmeyer et al. 2014; Espeset et al. 2012).

A more specific problem faced by those diagnosed with EDs is negative mood regulation (Spence and Courbasson 2012). Women with EDs have been found to feel less competent in their ability to better their negative moods (i.e., they have low expectations for their ability to regulate negative moods; Gilboa-Schechtman et al. 2006). While some ED patients use emotional eating as a means to distract from their negative affect (Elmore and de Castro 1991), others may face negative emotional consequences as a result of their emotional eating (Davis et al. 1985).

Anxiety has likewise been an issue associated with EDs (Levinson et al. 2019). Anxiety disorders are highly

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prevalent in ED patients (Swinbourne et al. 2012). It has been theorized that baseline anxiety can lead to fear of food and subsequent avoidance and restriction of food in patients with AN (Steinglass et al. 2010). BN patients have also been found to experience anxiety while eating, which contributes to their urge to vomit their food (Leitenberg et al. 1984). Levinson et al. (2017) concluded that sensitivity to physical sensations, such as changes in appetite and dizziness, are bridge symptoms between BN, anxiety, and depression.

A potential treatment for EDs, particularly cases in which emotion-based symptoms are prevalent, is dialectical behavior therapy (DBT). DBT is an intensive and specialized derivative of cognitive behavioral therapy (CBT), which was originally developed to treat chronic suicidal ideation and has since become standard treatment of emotion regulation disorders, such as borderline personality disorder (BPD; Linehan 1993; Linehan et al. 1994). This is appropriate given that a core feature of DBT treatment is to target severe emotional dysregulation (Bankoff et al. 2012; Ben-Porath et al. 2009; Federici et al. 2012). Clinical researchers have examined the utility of DBT in the treatment of AN and BN for several years (Brown et al. 2019; Federici et al. 2012; Hill et al. 2011; Mitchell et al. 2007; Wisniewski and Ben-Porath 2015).

Another form of treatment that can be beneficial for women with EDs is day treatment. Day treatment, or day hospitalization, is conducted in a facility where patients are provided diagnostic services and treatment that they would typically receive in an inpatient setting (Zipfel et al. 2002). In contrast to inpatient treatment, day treatment enables patients to return to their homes each night and on weekends so that the skills taught in treatment can be generalized to their home environment (Fittig et al. 2008).

Current Study

The just reviewed studies illustrate the potential utility of combining day treatment with DBT-based interventions to treat eating disorders. Ben-Porath et al. (2010) conducted a study which found that DBT-informed day treatment for EDs can bring about statistically and clinically significant gains in treating depression and ED symptoms (Ben-Porath et al. 2010). The purpose of the current study was to use the data from Ben-Porath et al. (2010) in order to assess the effectiveness of DBT day treatment in treating negative mood regulation expectancies and anxiety in women with EDs. We hypothesized that women in the study sample would demonstrate statistically significant improvements in scores on the Beck Anxiety Inventory (BAI; Beck and Steer 1993) and the Generalized Expectancy for Negative Mood Regulation Scale (NMR; Catanzaro and Mearns 1990) from intake to discharge from the program. We further explored improvements in these areas using Jacobson and Traux's (1991) clinically significant change criteria.

Method

Participants

Participants in the current study consisted of 54 women who were recruited from an ED day treatment center in Cleveland, Ohio over the course of 18 months. Overall, 51 (94.4%) of the women were Caucasian and three (5.6%) were Hispanic. 36 (66.7%) of the women were single, 14 (25.9%) married, three divorced (5.6%), and one (1.9%) widowed. The average age of the women was 26.3 years ($SD = 7.39$). 8 (14.8%) of the women were diagnosed with AN, 27 (50%) were diagnosed with BN, and 19 (35.2%) were diagnosed with an eating disorder not otherwise specified (EDNOS).

Women seeking ED treatment were assessed for two hours by a licensed mental health worker to establish whether they met ED criteria according to the DSM-IV. This assessment also determined whether these individuals were placed in IOP or PHP. Participants were admitted to one of the programs based on criteria set forth by the American Psychological Association Work Group on Eating Disorders (Bell et al. 2000). According to these guidelines, decisions regarding the placement of patients are dependent upon the women's weight, metabolic, and cardiac status at intake. Concurrent medical problems such as suicidality, uncontrolled vomiting, and vital sign changes further helped practitioners determine program placement. The placement in IOP or PHP was also decided by the amount of oral food intake and ability to resolve stressors previously acknowledged by the patient. Overall, of the 54 women in the study sample, 17 (31.5%) were placed in an intensive outpatient program (IOP) and the remaining 37 (68.5%) were placed in partial hospitalization treatment (PHP).

Measures

The Beck Anxiety Inventory (BAI; Beck and Steer 1993*).* The BAI is a widely used tool intended to assess for the presence and severity of anxiety (Bardhoshi et al. 2016). This measure has been frequently used to assess anxiety in ED patients (Ben-Porath et al. 2009; Haynos et al. 2015; Levinson et al. 2017; Steinglass et al. 2010). The questionnaire is comprised of 21 items rated over the previous week on a 4-point Likert scale. According to Creamer et al. (1995), the BAI has acceptable aggregated internal consistency with a Cronbach's alpha of 0.91 and a test–retest reliability of 0.62. Higher BAI scores are indicative of more anxiety.

Generalized expectancy for negative mood regulation (NMR) Scale (Catanzaro and Mearns 1990). The NMR is a

30-item scale that assesses a patient's own expectancy that they will alleviate negative mood through certain behaviors or cognitions. This measure has been used by several researchers assessing negative mood regulation expectancies in ED patients (Ben-Porath et al. 2009; Gilboa-Schechtman et al. 2006; Spence and Courbasson 2012). Respondents are asked to answer items on a 5-point Likert scale. The NMR includes three scales: general, cognitive, and behavioral. For the purposes of the current study, the total score was used in analyses. The internal consistency of the NMR was found to range from 0.86 to 0.92 (Catanzaro and Mearns 1990). Higher NMR scores indicate more appropriate mood regulation.

Procedure

Participants who had received treatment previously at the facility, were actively homicidal/suicidal, met criteria for a substance abuse disorder, or were under age 18 were excluded from this study. If a patient's ED symptoms did not warrant the high level of care commensurate with IOP or PHP, then the patient was referred to an outpatient ED therapist in their community. If their symptoms were so severe that they required a higher level of care than could be provided in IOP or PHP, or if the patients deteriorated throughout the course of PHP treatment, then they were referred to a residential ED treatment clinic/facility. Upon admission into the appropriate program, both IOP and PHP patients began receiving DBT-informed treatment. All patients took part in group skills training in the areas of mindfulness, emotional regulation, distress tolerance, and interpersonal conflict management twice weekly. Patients attended additional DBT-informed groups, such as weekly motivation and commitment-focused groups, a goal setting group, and a behavior chain analysis group. Specifically, in the behavior chain analysis group, clients were instructed to write in detail about the emotions, events, physical sensations, and cognitions that contributed to their ED behavior and any other maladaptive behaviors. Patients also completed daily diary cards used to keep track of their target ED behaviors as well as any self-injurious and/or suicidal behaviors. Additionally, patients participated in a "DBT in-action" group in which they practiced DBT skills in order to promote the application of said skills in life after treatment. Patients likewise participated in weekly group yoga which incorporated mindfulness practices. In addition, a nutrition module taught patients healthy eating and meal planning practices. Finally, as part of the DBT-informed treatment, patients ate healthy meals together as a form of exposure therapy. This treatment was conducted and overseen by a team of DBT-trained health care professionals, including a psychologist, psychiatrist, nutritionist, social worker, and milieu therapists, all of whom had masters or doctorate degrees in their respective fields. These professionals met weekly to consult on cases within the DBT framework.

This study was conducted using archival data that was originally used by Ben-Porath et al. (2010). The original study was IRB approved and the participants gave informed consent prior to data collection. Use of this archival data was exempted by the John Carroll University Institutional Review Board under Exemption #4 as described in the 2018 Requirements of the Code of Federal Regulations, 45 CFR 46.104(d)(4). The NMR and BAI were administered to patients at the beginning and end of treatment. The average duration of treatment was 11.3 weeks ($SD = 6.1$ weeks). A total of 20 program participants dropped out of treatment prematurely.

Results

We first ran paired samples t-tests comparing BAI and NMR scores before and after treatment (Table 1). On average, BAI scores before treatment ($M = 19.44$, $SD = 10.77$) were significantly higher than BAI scores after treatment ($M = 13.82$, $SD = 10.44$), $t(53) = 3.25$, $p = 0.002$, $d = 0.44$). Consistent with expectations, NMR scores before treatment ($M = 89.13$, $SD = 21.2$) were significantly lower than NMR scores after treatment ($M = 101.65$, $SD = 16.35$), $t(47) = -3.64$, $p = 0.001$, $d = -0.53$).

Utilizing the clinically significant change model (Jacobson and Truax 1991), the current study further examined the treatment's effects of anxiety and mood regulation expectancy as operationalized by patient scores on the BAI and NMR, respectively. In accordance with this model and in the context of the current study, clinically significant change occurred when the post treatment score of the patient met the following two criteria: (1) the magnitude of the change

Table 1 Pre-post mean score differences in BAI and NMR scores

		Pre-Treatment		Post-Treatment					
Scale	*N*	*M*	*SD*	*M*	*SD*	*t*	*df*	*p*	*d*
BAI	54	19.44	10.77	13.82	10.44	3.25	53	.002	.44
NMR	48	89.13	21.2	101.65	16.35	−3.64	47	.001	−.53

Lower scores on NMR indicate worse functioning

BAI beck anxiety inventory, *NMR* generalized expectancy for negative mood regulation scale

was statistically reliable such that the change from treatment exceeds the measurement error of the instrument used to assess the change (i.e., 1.96 multiplied by the outcome measure's standard error of difference) and (2) post treatment scores were statistically more likely to be found in the general (non-clinical) population rather than the patient (clinical) population.

Individuals who met both of these criteria (e.g., statistically reliable pre-post change and post treatment scores in the non-clinical range) were classified as ''recovered.'' If the patient was found to have made statistically significant and reliable change after treatment, yet was still in the clinical range, the client could be classified as ''improved but not recovered.'' If the client at the end of treatment fell within the functional range of the population, but the change was not statistically reliable, then the client likely was not clinically disturbed prior to treatment and little could be said about their progress in treatment. Thus, the client was classified as ''undetermined.'' If a client's score fell in the dysfunctional range post treatment and their RCI score indicated that they had significantly deteriorated, the client was classified as ''reliably deteriorated.'' Lastly, if the client did not make statistically significant and reliable change and they remained in the dysfunctional range (but do not meet the criteria for ''reliably deteriorated'') the client was classified as ''unchanged.''.

The reliable change index values for anxiety were derived from BAI general population normative data provided by Creamer et al. (1995) as well as the intake BAI scores from the current study using the formula provided by Jacobson and Truax (1991). Specifically, for the Reliable Change Index, the general population normative data showed a standard error of measurement (SEM) value of 2.88. Applying the following formula derived from Jacobson and Truax (1991) resulted in a value of 7.98 for the Reliable Change Index: 1.96 *sqrt(2 * 2.88). For the midpoint between the non-clinical vs. clinical population samples, we employed means and standard deviations from the general population normative sample of BAI scores ($M = 13.1$, $SD = 9.6$) and from the intake BAI scores of the current study ($M = 19.44$, $SD = 10.77$). The following formula (Jacobson and Truax 1991) yielded a value of 16.09 as the midpoint of the non-clinical population versus the clinical population: (((10.77 * 13.1) + (9.6 * 19.44))/(9.6 + 10.77)). Thus, patients were deemed to have recovered if their BAI score decreased/improved by 7.98 (Reliable Change Index) to a score below 16.09 (midpoint between non-clinical and clinical population).

BAI scores were available at intake and post-treatment time points for 54 patients assessed for purposes of the current study. Overall, 19 of these patients (35.2%) met the criteria for clinically significant recovery, such that their BAI score decreased by more than 7.98 points (Reliable Change Index) to a value less than 16.09 (non-clinical versus clinical population midpoint). Of the 35 remaining patients, two individuals (3.7%) showed reliable change in the direction of improvement but ultimately did not score below the non-clinical/clinical population midpoint of 16.09, eight (14.8%) showed reliable change in the direction of deterioration, 10 (18.5%) showed no change, and 15 (27.8%) began and ended in the normal range of scores. Therefore, these 35 patients (64.8%) could not be considered recovered.

The reliable change index values for mood regulation expectancy were derived from NMR general population normative data provided by Catanzaro and Mearns (1990) as well as the intake NMR scores from the current study using the formula provided by Jacobson and Truax (1991). Specifically, for the Reliable Change Index, the general population normative data showed a standard error of measurement (SEM) value of 5.17. Applying the following formula derived from Jacobson and Truax (1991) resulted in a value of 14.33 for the Reliable Change Index: 1.96 * sqrt(2 * 5.17). For the midpoint between the non-clinical vs. clinical population samples, we utilized means and standard deviations from the general population normative sample of NMR scores ($M = 99.14$, $SD = 14.33$) and from the intake NMR scores of the current study ($M = 89.13$, $SD = 21.2$). The following formula (Jacobson and Truax 1991) yielded a value of 98.1 as the midpoint of the non-clinical population versus the clinical population: (((21.2 * 99.14) + (14.33 * 89.13))/(21.2 + 14.33)). Thus, patients were deemed to have recovered in terms of mood dysregulation if their NMR total score increased/improved by 14.33 (Reliable Change Index) to a score above 95.1 (midpoint between non-clinical and clinical population).

NMR scores were available at intake and post-treatment time points for 48 patients assessed for purposes of the current study. Overall, 19 of these patients (39.6%) met the criteria for clinically significant recovery, such that their NMR score increased by more than 14.33 points (Reliable Change Index) to a value more than 95.1 (non-clinical versus clinical population midpoint). Of the 29 remaining patients, two individuals (4.2%) showed reliable change in the direction of improvement but ultimately did not score above the non-clinical/clinical population midpoint of 95.1, four (8.3%) showed reliable change in the direction of deterioration, 10 (20.8%) showed no change, and 13 (27.1%) began and ended in the normal range of scores. Therefore, these 29 patients (60.4%) could not be considered recovered.

Post Hoc Analysis

Using independent samples t-tests, we compared pre- and post-BAI and NMR scores, as well as BAI and NMR change scores, across treatment types (PHP or IOP) and diagnoses (BN or EDNOS; AN excluded due to inadequate sample

size). For diagnosis, the pre-and post-NMR scores, as well as NMR change scores, had significantly different variances according to the Levene's test (p's < 0.05). We also found that individuals with EDNOS ($M = -4.61$, $SD = 27.74$) had significantly less improvement in NMR scores compared to those with BN ($M = -22.47$, $SD = 15.98$), $t(25.637) = 2.435$, $p = 0.022$, $d = -1.24$. For all other comparisons, Levene's tests and mean comparisons were non-significant at an alpha of 0.05.

Discussion

The results of the current study demonstrated statistically significant improvements in mood regulation expectancies and anxiety after DBT day treatment. As noted earlier, these issues can be prevalent for women presenting with AN and BN (Levinson et al. 2019; Spence and Courbasson 2012). Further, results indicated that a large proportion of the sample achieved clinically significant change in these areas. Several aspects of these findings warrant further discussion.

Past research with this sample indicated that a DBT day treatment program was successful in treating maladaptive eating behaviors and negative attitudes towards eating and body image (Ben-Porath et al. 2010). The findings that emotional regulation expectancy and anxiety scores significantly improved from pre- to post-treatment further supports the overall efficacy of this sort of program. The examination of BAI and NMR scores in the context of the clinically significant change model of outcome measure progress (Jacobson and Truax 1991) qualified the pre-post comparison findings, as not all individuals with EDs present with problems in these areas. For example, we found that approximately one-fourth of our sample began and ended treatment in the normative range on the BAI and NMR. However, for the 39 patients that presented with elevated anxiety levels at intake, a majority either recovered ($n = 19$; 49%) or reliably improved ($n = 2$; 5%). Similarly, among the 35 individuals with elevated levels of negative mood dysregulation expectancy we found that a majority either recovered ($n = 10$; 54%) or reliably improved ($n = 2$; 6%). In post-hoc analyses, we found that women with BN had substantially improved negative mood regulation expectancies compared to those with EDNOS; future research is needed to determine if this finding replicates.

This study has notable strengths. First, this study adds to small but now growing literature on the effectiveness of DBT day treatment for eating disorders. Moreover, the use of a sample from a clinical population improves the external validity of the study. Finally, treatment was delivered by practitioners who underwent extensive DBT-informed training before administering the treatment, which improves the internal validity of the study.

Nevertheless, this study has several limitations. To start, the sample size of this study was small. The small number of women in this program could be attributed to issues with affordability and duration of the program. An additional limitation is the lack of randomization and control group. Therefore, it is impossible to state unequivocally that change was due to treatment. It should also be noted that because this study was conducted using archival data collected in the early 2000s, the results may not be fully generalizable to ED patients today. Finally, the treatment program was multifaceted and future research is needed to determine which components were most effective.

In sum, the results of this study show that women who were diagnosed with AN and BN and underwent treatment in a DBT day program experienced improvement in their anxiety levels as well as their mood regulation expectancy. Moreover, notwithstanding its limitations, this study is one of the first to examine the utility of DBT day treatment in treating women diagnosed with eating disorders.

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Compliance with Ethical Standards

Conflict of interest The authors have no conflicts of interest to report.

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