

# Effectiveness of Dialectical Behavior Therapy (DBT) in a Forensic Psychiatric Hospital

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Dialectical behavior therapy (DBT) has strong evidence in support of its effectiveness in reducing suicide attempts, anger, impulsivity, and substance abuse. It has been implemented in a variety of forensic settings to help with these challenges, despite limited research on the efficacy of DBT within this population. The current study presents treatment outcomes from an established DBT program in a maximum-security forensic facility. Outcomes included self-reported functioning, behavioral outcomes, and assessment of DBT skills knowledge among inpatients who participated in either comprehensive DBT or DBT skills training. Behaviorally, the study found a significant decrease in rates of patient assaults and reduced use of “*Pro re nata*” (PRN) medication for anxiety or agitation over the course of DBT treatment. During the first six months of treatment, self-reported symptoms of depression, emotional and behavioral dysregulation, and psychological inflexibility significantly decreased. Within this time frame, patients also displayed a significant decrease in the use of dysfunctional coping skills and a significant increase in knowledge pertaining to emotion regulation and interpersonal effectiveness. The results of this study largely support the use of DBT in forensic settings.

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The treatment of patients in forensic facilities presents a unique set of challenges. These patients are mandated for treatment because of their legal situation, and often the treatment focus is on addressing court-related goals such as restoration of competency or treating symptoms of severe mental illness. Interventions are designed to address many concurrent objectives, including psychiatric rehabilitation, patient safety, and reducing re-offense risk. Further complicating matters is the high prevalence of comorbid, chronic, and complex conditions such

as psychosis, personality disorders, and substance use disorders.<sup>1–8</sup>

Forensic psychiatric hospitals, in which patients are remanded by the criminal justice system, have long been discussed in connection with violence or aggression that is both quantitatively and qualitatively different than typical inpatient settings.<sup>9–11</sup> A multi-hospital study analyzing the prevalence of physical violence in a state psychiatric system over the span of three years found that 26 percent of forensic patients had committed at least one act of patient assault and 16 percent of patients had at least one incident of staff assault.<sup>12</sup> These incidents not only cause physical and emotional harm to staff within forensic hospitals,<sup>13–17</sup> but can also create an atmosphere that leads other patients to become more symptomatic and consequently behave more violently toward staff and peers as a result of feeling unsafe.<sup>18–21</sup>

Research demonstrating the harmful effects of patient seclusion and restraint has led regulatory bodies such as The Joint Commission (TJC) and

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The Centers for Medicare and Medicaid Services (CMS) to emphasize less physically coercive measures for managing aggressive or violent behavior on inpatient units.<sup>22-24</sup> A commonly used pharmacological intervention for patient agitation and potential violence or aggression is “*Pro re nata*” (PRN), “when required” or “as needed” medication. A PRN is a written order for psychotropic medications that can be given to patients outside of prescheduled administration times at the discretion of nursing staff or at the patient’s request based on immediate need.<sup>25,26</sup> PRN use within forensic hospitals is common practice.<sup>27</sup> The most common PRN medications are benzodiazepines, antipsychotics, and sedatives that aid in reducing patient agitation, anxiety, symptoms of psychosis, and violent behaviors.<sup>28-34</sup> Studies that have investigated rates of PRN usage in forensic hospitals found that 37 percent of patients had received a sedative PRN over a two-week period.<sup>35</sup> The use of PRNs has become increasingly controversial because of concerns of dependency, abuse, administration errors, overmedication, and ambiguity surrounding the decision to prescribe or administer such medications.<sup>36-41</sup> Research suggests that combining pharmacological interventions like PRNs with psychosocial interventions can be effective in minimizing the risk and negative effects associated with PRN use, as well as improving overall patient quality of life.<sup>42,43</sup>

Dialectical behavior therapy (DBT) is an evidence-based treatment developed for individuals presenting with pervasive and persistent emotional dysregulation.<sup>44-46</sup> It integrates Eastern mindfulness practices with traditional cognitive behavioral interventions such as problem solving, skills training, exposure therapy, and cognitive modification. Although originally developed by Marsha Linehan for individuals with chronic suicidality and those diagnosed with borderline personality disorder (BPD), DBT gained popularity among those in forensic settings almost immediately after its inception<sup>47,48</sup> because of its demonstrated effectiveness treating individuals with substance use disorders,<sup>49-51</sup> antisocial personality traits,<sup>52</sup> and some emotional manifestations of psychopathy.<sup>53,54</sup> Research shows involvement in DBT skills training programs reduces self-injurious behavior,<sup>55,56</sup> impulsivity,<sup>57-59</sup> violent behavior,<sup>60</sup> aggressive behavior,<sup>55,61-63</sup> disciplinary actions,<sup>55,64</sup> anxiety,<sup>65-67</sup> and depression,<sup>65-67</sup> while increasing coping skills.<sup>62,63,68-70</sup> Studies investigating the effectiveness of DBT within inpatient settings specifically have found that patients have fewer

behavioral incidents, including aggression toward others, and use less psychotropic PRN medication.<sup>71-73</sup>

McCann *et al.*<sup>52</sup> posit that DBT is an intervention that aligns well with treatment needs in inpatient forensic settings. DBT utilizes many principles of cognitive behavior therapy (CBT), an intervention which has reduced recidivism by up to 55 percent,<sup>74-79</sup> especially for individuals at high risk of reoffending due to dynamic risk factors.<sup>80</sup> More recently, DBT has been recognized as having many similarities to one of the most prominent and evidence-based risk reduction models, the Risk Need Responsivity Model.<sup>81,82</sup> DBT directly targets reduction of life-threatening behaviors such as physical aggression, suicidality, and nonsuicidal self-injury. DBT’s efficacy in reducing these behaviors helps patients move to less restrictive settings, and has been shown to positively affect staff burnout,<sup>83-87</sup> which is common in high-stress environments such as forensic hospitals.<sup>88</sup>

Research on the efficacy of DBT in forensic contexts is limited and fraught with methodological concerns, such as small sample sizes, lack of participant follow-up, randomization, comparison groups, and treatment fidelity monitoring.<sup>89</sup> In addition, there is a lack of consistency between studies on the frequency, duration, and modes of treatments being offered.<sup>48,90</sup> Comprehensive DBT (C-DBT) must address five treatment functions. The first is client motivation, which is typically accomplished through individual DBT therapy. The second is skill building, which is often addressed through skills training groups. The third is generalizability of skills, which is often addressed through phone or milieu coaching. The fourth is structuring the environment, and the fifth is building motivation and capability of the treatment providers via weekly DBT team consultation meetings. Because of the lack of resources and competing administrative demands, it is more common within forensic settings to provide standalone skills training, which has shown efficacy in reducing a variety of problems targeted in DBT, rather than comprehensive DBT.<sup>66,91-93</sup>

The current study explored the effectiveness of an inpatient DBT program in a maximum security forensic psychiatric hospital. The program offered standalone skills training or comprehensive DBT based upon individual patient needs. The present study aimed to examine self-reported functioning

throughout program participation, assess DBT knowledge acquisition through pre-post testing, and explore the relationship between involvement in DBT treatment and empirical outcomes. It was hypothesized that patients would experience fewer self-reported mood-related mental health symptoms, have greater perceived ability to cope with day-to-day problems, and demonstrate gains in DBT knowledge positively associated with time in the program. Finally, it was hypothesized that patients would use fewer PRN medications for anxiety or agitation and have fewer incident reports as they spent more time in DBT treatment.

### Method

#### *Participants and Procedure*

This study was reviewed and approved by the Michigan Department of Health and Human Services Institutional Review Board. The sample consisted of adult inpatients at the Center for Forensic Psychiatry (CFP) in Saline, Michigan who participated in DBT treatment between 2010 and 2023. The CFP inpatient program provides treatment for individuals found incompetent to stand trial (IST) or not guilty by reason of insanity (NGRI), and for those individuals who are unable to be treated at other less restrictive state psychiatric hospitals. Patients were referred to the DBT program by their primary social worker or treatment team if identified as individuals with behavioral or emotional dysregulation. Priority was given to patients engaging in life-threatening behaviors such as violence, self-harm, or severe behavioral dyscontrol. Patients were excluded from the DBT program if psychotic symptoms prevented them from attending to reality to such a degree that they could not benefit from treatment. Patients were also excluded if they presented with intellectual, developmental, or cognitive difficulties that prevented them from learning new information.

Over the years, the DBT treatment team at the CFP has included clinicians from psychology, psychiatry, social work, recreational therapy, nursing, and direct care staff. Team members were instructed in Linehan's DBT model through either internal or external trainings by a DBT-LBC (Linehan Board Certified) clinician. Team members providing individual DBT therapy were licensed clinicians who completed more intensive training in principles and protocols of DBT. In keeping with model fidelity,

the treatment team met weekly for DBT team consultation meetings. The team implemented Linehan's "Schedule 1: Standard Adult DBT Skills Training"<sup>94</sup> program, which consisted of weekly two-hour skills training groups covering the four modules (mindfulness, distress tolerance, emotion regulation, and interpersonal effectiveness) over the span of six months (repeated once). Patients were assigned to skills training only or to comprehensive DBT (with weekly hour-long individual DBT therapy and more focused coaching) based on the severity of their presenting problems. The skills training groups followed an established six-month schedule, and group members could be admitted or discharged on a continuing basis. The skills groups were gender co-ed with group sizes ranging from three to 16. Groups were held at the hospital in either a common space or on the unit.

To assess the efficacy of DBT, a treatment outcome program was implemented which involved administering assessment packets (self-report measures and knowledge quizzes) to patients when they first entered treatment and at the end of each six-month skill-training cycle. Behavioral data were collected in four three-month increments from the electronic medical record (Q1 = start of treatment through month three; Q2 = month four through month six; Q3 = month seven through month nine; Q4 = month nine through month 12). Patient data were excluded from the analysis if not collected within 30 days of the start of DBT intervention or the end of each six-month cycle, and only data from a patient's first CFP admission were included.

#### *Measures*

##### *Self-Report Measures*

The Acceptance and Action Questionnaire (AAQ-II)<sup>95</sup> is a seven-item self-report questionnaire. It measures the ability to adapt to fluctuating situational demands, reconfigure mental resources, shift perspective, and balance competing desires, needs, and life domains to reach long-term goals.<sup>96</sup> Response options are on a seven-point Likert scale, ranging from never true (1) to always true (7), where higher scores reflect greater psychological inflexibility, experiential avoidance, and more potential psychological distress. The internal consistency of the AAQ-II in the current study was  $\alpha = .92$  (excellent reliability).

The Patient Health Questionnaire (PHQ-9)<sup>97</sup> is a nine-item, self-report questionnaire that examines

symptoms of depression over the previous two weeks. Response options are on a four-point Likert scale, ranging from not at all (zero) to nearly every day (3), where higher scores reflect more symptoms of depression. The internal consistency of the PHQ-9 in the current study was  $\alpha = .85$  (good reliability).

The Borderline Symptom List (BSL-23)<sup>98</sup> is a 23-item, self-report questionnaire which examines symptoms of borderline personality disorder, such as identity disturbance, emotional instability, unstable interpersonal relationships, and others over the course of the previous week. Response options are on a five-point Likert scale, ranging from not at all (zero) to very much (4), where higher scores reflect more symptoms. The internal consistency of the BSL-23 in the current study was  $\alpha = .95$  (excellent reliability).

The Dialectical Behavior Therapy Ways of Coping Checklist (DBT-WCCL)<sup>99</sup> is a 59-item self-report measure that assesses coping strategies in difficult situations. The measure has three subscales: DBT Skills Use, General Dysfunctional Coping, and Blaming Others. The internal consistency of these scales within this study were  $\alpha = .95, .88, \text{ and } .82$ , respectively (excellent to good reliability). Higher scores on the DBT Skills Use subscale reflect greater skills use. Higher scores on General Dysfunctional Coping and Blaming Others subscale reflect dysfunctional coping.

#### *DBT Knowledge*

Before and after each module, patients were administered knowledge quizzes to assess their attainment and understanding of DBT skills. The quizzes were developed by the CFP DBT consultation team and consisted of 10 multiple-choice or true or false questions for each module.

#### *Behavioral Outcomes*

The electronic medical record was reviewed to count the frequency of incident reports and the use of PRN medication for agitation or anxiety. In the present study, incident reports analyzed included assaults (with patient-to-patient and patient-to-staff assaults combined because of low base rates of each) and behavioral dyscontrol (verbal assaults against patient, verbal assaults against staff, oppositional behavior, elopement, or sexual behavior). Because of a low base rate at the facility, incidents of self-harm or suicidal action were not included in the present study.

#### **Data Analysis**

Statistical analyses were performed using the IBM Statistical Package for the Social Sciences (SPSS), Version 28.0 software. To analyze differences between self-report measures and scores on the DBT knowledge quizzes from baseline to six months of treatment, paired sample *t* tests were conducted. Cohen's *d* was used to report effect size, where  $d = .2$  indicates a small effect,  $d = .5$  indicates a medium effect, and  $d = .8$  a large effect.<sup>100</sup> Because of administrative difficulties and staggered participant admissions into the DBT program, baseline self-report measures for an additional 173 patients and 29 six-month follow-up measures had to be excluded, resulting in reduced and varied sample sizes for each analysis. Only baseline to six-month data were reported because of power concerns.

One-way repeated-measures analysis of variance (ANOVA) were conducted to examine the differences in behavioral outcomes (PRNs and incident reports) across four quarters of DBT treatment. In each of these analyses, violations of sphericity occurred as indicated by Mauchly's Test of Sphericity statistic ( $P < .05$ ); therefore, Greenhouse-Geisser corrections were used. Partial eta squared ( $\eta^2$ ) was used to report effect size where  $\eta^2 = .01$  indicates a small effect,  $\eta^2 = .06$  indicates a medium effect, and  $\eta^2 = .14$  indicates a large effect.<sup>100</sup> Bonferroni corrections were used to analyze differences in time periods for statistically significant repeated-measures ANOVAs. All significance tests used a two-tailed *P* value of .05.

#### **Results**

The sample, as detailed in Tables 1 and 2, consisted of adult inpatients, ranging in age from 18 to 72, who were predominantly male. There were no significant differences in outcomes between these two groups on any dependent variables, so the data were analyzed in aggregate.

#### **Self-Report Measures**

As shown in Table 3, patients reported significantly lower scores of psychological inflexibility as measured by the AAQ-II,  $t(71) = 3.274, P < .001$ , and  $d = .39$  from baseline to six months of DBT treatment. Patients also reported a significant decrease in their symptoms related to depression per the PHQ-9,  $t(73) = 2.698, P < .01$ , and  $d = .31$  from baseline to six months. Additionally, there was a significant

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**Table 1** Patient Descriptive Data ( $N = 650$ )

Variable	Mean (SD)	$N$ (%)
Age	37.1 (11.9)	—
Gender		
Female	—	127 (19.5)
Male	—	523 (80.5)
Ethnicity		
White	—	401 (61.7)
Black	—	226 (34.8)
Asian	—	9 (1.4)
Hispanic	—	6 (0.9)
Arabic	—	4 (0.6)
Indian and Alaskan Native	—	4 (0.6)
Legal Status		
Not guilty by reason of insanity (NGRI)	—	498 (76.6)
Incompetent to stand trial (IST)	—	146 (22.4)
Other (civil and voluntary admission)	—	6 (1.0)
Number of Diagnoses		
One	—	323 (49.7)
Two	—	240 (36.9)
Three	—	73 (11.2)
Four	—	14 (2.2)
Psychiatric Diagnosis		
Substance use disorder	—	260 (40.1)
Psychotic disorder	—	234 (36.0)
Schizoaffective disorder	—	202 (31.1)
Bipolar disorder	—	176 (27.1)
Other affective disorder	—	51 (7.8)
Borderline PD	—	31 (4.8)
Not otherwise specified PD	—	28 (4.3)
Intellectual disability diagnosis	—	25 (3.8)
Antisocial PD	—	23 (3.5)
PTSD	—	23 (3.5)
Anxiety disorder	—	14 (2.1)
Narcissistic PD	—	6 (0.9)
Dependent PD	—	3 (0.5)

<sup>a</sup>The frequency distributions total more than  $N = 650$  because of the overlap in diagnoses.

Abbreviations: PD = personality disorder, PTSD = posttraumatic stress disorder

**Table 2** Descriptive Data on Length of Stay Measured in Months ( $N = 592$ )

Legal Status at Admission	$N$	Mean (SD)
NGRI	451	23.1 (38.0)
IST	135	19.1 (27.5)
Other (Civil and Voluntary)	6	16.0 (22.7)

Abbreviations: IST = incompetent to stand trial, NGRI = not guilty by reason of insanity

reduction in symptoms associated with BPD as measured by the BSL,  $t(138) = 2.447$ ,  $P < .01$ , and  $d = .21$  from baseline to six months.

There was a significant decrease in reported use of general dysfunctional coping mechanisms as measured by the WCCL from baseline to six months,  $t(69) = 2.094$ ,  $P < .05$ , and  $d = .25$ . There was also a significant decrease in blaming others as a coping

mechanism from baseline to six months,  $t(69) = 1.936$ ,  $P < .05$ , and  $d = .23$ . There was no significant increase in the use of DBT skills between baseline and six months of treatment.

### DBT Knowledge Quizzes

As shown in Table 3, patients demonstrated a significant increase in emotion regulation knowledge from baseline to six months of DBT treatment,  $t(30) = -2.334$ ,  $P < .05$ , and  $d = -.42$  as measured by the DBT knowledge quizzes. They also demonstrated a significant increase in interpersonal effectiveness knowledge from baseline to six months of treatment,  $t(30) = -2.718$ ,  $P < .01$ , and  $d = -.49$ . There were no significant differences on distress tolerance and mindfulness knowledge quizzes between baseline and six months.

### Behavioral Outcomes

As shown in Tables 4 and 5, the frequency of assaultive incidents among patients across the four treatment quarters significantly decreased ( $F(2.798, 702.416) = 5.366$ ,  $P < .01$ ,  $\eta^2 = .021$ ). *Post hoc* analyses showed a significant mean decrease of .12 (SE = .042,  $P < .05$ ) in the number of assaultive incidents from Q1 to Q4. Similarly, there was a significant decrease ( $M = .14$ , SE = .047,  $P < .05$ ) in the mean number of assaultive incidents from Q2 to Q4. The frequency of incidents related to behavioral dyscontrol at different time periods was nonsignificant. No *post hoc* analyses were conducted.

There was a significant decrease in patient use of PRN medication for agitation or anxiety across the four quarters ( $F(2.347, 499.989) = 6.613$ ,  $P < .001$ ,  $\eta^2 = .030$ ). *Post hoc* analyses show a significant mean decrease of 4.55 (SE = 1.349,  $P < .05$ ) from PRN use during Q1 to PRN use during Q4. All other *post hoc* analyses were nonsignificant.

### Discussion

This study is believed to be the largest published on the effectiveness of a DBT program in a forensic psychiatric inpatient setting to date.<sup>92</sup> Given the various domains of patient functioning captured throughout program participation, this study provides a more nuanced understanding of how DBT may relate to patients' psychiatric rehabilitation and hospital safety. The study assessed patient improvement using a

**Table 3** Descriptive Statistics for Paired Sample *T*-Test Analyses

	Baseline		6-Month Follow-Up		<i>P</i> -Value	Cohen's <i>d</i>
	Mean Score (SD)	Range	Mean Score (SD)	Range		
<b>Self-Report Measures</b>						
AAQ-II ( <i>N</i> = 72)	18.22 (9.70)	7.00–47.00	15.49 (8.19)	7.00–43.00	<.001 <sup>c</sup>	.386
PHQ-9 ( <i>N</i> = 74)	5.55 (5.43)	0.00–25.00	4.22 (4.43)	0.00–18.00	.004 <sup>b</sup>	.314
BSL-23 ( <i>N</i> = 139)	0.65 (0.72)	0.00–4.00	0.54 (0.65)	0.00–3.45	.008 <sup>b</sup>	.208
<b>Ways of Coping</b>						
Use of DBT skills ( <i>N</i> = 70)	1.73 (0.67)	0.00–2.95	1.78 (0.70)	0.00–2.84	.236	–.086
Use of dysfunctional coping ( <i>N</i> = 70)	1.23 (0.72)	0.00–3.00	1.09 (0.68)	0.00–2.73	.020 <sup>a</sup>	.250
Blaming others ( <i>N</i> = 70)	0.76 (0.77)	0.00–3.00	0.62 (0.65)	0.00–2.67	.029 <sup>a</sup>	.231
<b>DBT Knowledge Quizzes</b>						
Mindfulness ( <i>N</i> = 31)	5.87 (1.75)	1.00–8.00	6.23 (1.88)	1.00–8.00	.148	–.191
Distress tolerance ( <i>N</i> = 31)	6.23 (1.96)	1.00–8.00	6.61 (1.26)	3.00–8.00	.089	–.248
Emotion regulation ( <i>N</i> = 31)	5.23 (1.93)	0.00–8.00	5.97 (1.72)	0.00–8.00	.013 <sup>a</sup>	–.419
Interpersonal effectiveness ( <i>N</i> = 31)	4.61 (2.06)	0.00–7.00	5.52 (2.10)	0.00–8.00	.005 <sup>b</sup>	–.488

<sup>a</sup>*P* < .05.

<sup>b</sup>*P* < .01.

<sup>c</sup>*P* ≤ .001.

Abbreviations: AAQ-II = Acceptance and Action Questionnaire, BSL-23 = Borderline Symptoms List, PHQ-9 = Patient Health Questionnaire

**Table 4** Descriptive Statistics for Behavioral Outcomes

Behavioral Variables	Q1 Mean (SD) Range	Q2 Mean (SD) Range	Q3 Mean (SD) Range	Q4 Mean (SD) Range
Incidents of assault <sup>a</sup>	0.19 (0.61) 0.00–4.00	0.21 (0.80) 0.00–7.00	0.12 (0.51) 0.00–4.00	0.08 (0.41) 0.00–3.00
Incidents of behavioral dyscontrol <sup>b</sup>	0.18 (0.94) 0.00–10.00	0.09 (0.35) 0.00–2.00	0.07 (0.30) 0.00–2.00	0.09 (0.31) 0.00–2.00
PRN medication use <sup>c</sup>	6.28 (20.99) 0.00–179.00	4.06 (16.11) 0.00–165.00	4.24 (18.29) 0.00–177.00	1.73 (9.73) 0.00–121.00

<sup>a</sup>*N* = 252.

<sup>b</sup>*N* = 144.

<sup>c</sup>*N* = 214.

**Table 5** Repeated Measures ANOVA *Post Hoc* Analyses

Variable	<i>F</i>	<i>P</i>	$\eta_p^2$	Mean Difference	SE	<i>P</i>
Assaultive incidents	5.37	.001 <sup>c</sup>	.021	—	—	—
Q1–Q2	—	1.000	—	0.02	0.040	1.00
Q1–Q3	—	.234	—	–0.07	0.036	.234
Q1–Q4	—	.028 <sup>a</sup>	—	–0.12	0.042	.028 <sup>a</sup>
Q2–Q3	—	.075	—	–0.10	0.039	.075
Q2–Q4	—	.015 <sup>a</sup>	—	–0.14	0.047	.015 <sup>a</sup>
Q3–Q4	—	1.000	—	–0.04	0.037	1.00
PRN medication use	6.61	<.001 <sup>c</sup>	.030	—	—	—
Q1–Q2	—	.108	—	–2.22	0.932	.108
Q1–Q3	—	.228	—	–2.04	0.978	.228
Q1–Q4	—	.005 <sup>b</sup>	—	–4.55	1.349	.005 <sup>b</sup>
Q2–Q3	—	1.000	—	0.18	0.801	1.00
Q2–Q4	—	.101	—	–2.33	0.966	.101
Q3–Q4	—	.096	—	–2.51	1.033	.096
Behavioral dyscontrol incidents	1.49	.229	.010	—	—	—

<sup>a</sup>*P* < .05.

<sup>b</sup>*P* < .01.

<sup>c</sup>*P* ≤ .001.

variety of different measures: skill knowledge, behavioral outcomes, and self-perception of functioning.

According to Linehan's model, skill knowledge is the first step in any behavioral change.<sup>47</sup> Throughout

the first six months of participation in the DBT program, patients gained significant knowledge of emotion regulation skills as well as interpersonal effectiveness skills. These two modules of DBT are

similar in that both are change oriented, providing patients with concrete skills they can use to identify their values, reduce emotional vulnerability, manage emotional reactions, and navigate relationships. While means were higher at six-month follow-up when compared with baseline, the study did not find a significant increase in skill knowledge for the mindfulness and distress tolerance modules. Means were higher at baseline for these two modules, compared with the emotional regulation and interpersonal effectiveness modules. This may suggest that patients started with more knowledge of mindfulness and distress tolerance, and therefore had less room for improvement.

Although assaults occur infrequently, they have a large impact on patients and staff in the hospital. As life-threatening behaviors, they serve as a major barrier to patient discharge and community success.<sup>101,102</sup> In the present study, a significant reduction in assaults occurred over the course of the first year of DBT treatment. The reduction did not happen immediately. In working with unit staff, it is not uncommon for staff to claim that DBT does not work because there is no immediate improvement in life-threatening behaviors. This finding underscores that for many life-threatening behaviors, effects may not be seen until the second cycle of DBT skills training.<sup>94</sup>

In addition to assaults, there are a variety of other behaviors that result in incident reports. Incidents of behavioral dyscontrol include a continuum of behaviors in which patients lose control in a manner that is not life threatening. Reduction in behavioral dyscontrol trended in the desired direction but did not reach statistical significance. It is not uncommon for patients who are making progress with life-threatening behaviors (or other behaviors that keep them hospitalized) to continue to engage in lower-level behavioral targets, such as dumping a lunch tray, swearing, etc.

Another behavioral indicator of DBT's effectiveness is a significant reduction in the use of PRN medications for agitation or anxiety over the one-year DBT treatment period. In the current study, this indicator had the largest effect size of any behavioral measure assessed. There are two possible hypotheses for the decrease in PRN use. Patients may have applied DBT skills rather than relying on PRN medications when agitated. Alternatively, staff may have been more confident that patients could engage in self-management behaviors and de-escalate without the assistance of medication.<sup>27,28</sup>

In the current study, patient self-report measures were included as a measure of perceived clinical progress and were consistent with behavioral outcomes. Patients reported a significant decrease in symptoms related to depression and BPD after engaging in six months of DBT treatment, which is in line with previous studies.<sup>65,67</sup> Patients also reported a significant decrease in psychological inflexibility, suggesting that DBT skills helped them become more effectively adapting to situational demands. In a forensic setting, the ability to think flexibly may help people more effectively navigate the legal and hospital systems. It may result in increased insight into their mental illness, which is often a specific target in forensic treatment. In addition, it may help them work effectively toward their goals in the presence of difficult or unwanted thoughts, feelings, images, or memories.<sup>103</sup>

While the current study found promising and statistically significant results, there were limiting factors that must be considered. The current study was quasi-experimental rather than a randomized control trial (RCT). Therefore, there was no built-in control for alternative methods of treatment (e.g., medication management, other forms of psychotherapy, rehabilitation services, etc.). Similarly, the current study did not assess or control for previous exposure to DBT treatment, which could have resulted in greater gains for some patients. Another limitation was that the study did not compare patient functioning prior to the start of or after completion of DBT treatment.

In addition, there were limitations related to data validity that required the omission of patient data. As described above, patient self-report measures were excluded when they were not administered during consistent time periods. This happened primarily when patients were admitted to the group mid-cycle and did not receive follow-up measures within the required time frame. Further, COVID-19 interrupted programming and measure administration timelines. Additionally, variables (such as manual holds, seclusions, and restraints) were excluded because of inconsistencies in how data were operationally defined and measured over time in the hospital system. Nonetheless, we believe the findings of this study are generalizable to other forensic hospitals.

Future research on the effectiveness of DBT in forensic inpatient hospitals is warranted. Currently, no RCTs exist assessing the efficacy of DBT within a forensic setting. An RCT would provide an opportunity

to compare patients receiving DBT with those receiving other forms of treatment. Linking patients in different treatments would also provide an opportunity to identify the impact of possible confounding variables, such as level of psychosis and impact of medication management. Being able to include data on manual holds, seclusions, and restraints would provide more information on the severity of patient incidents. It would also be useful to gather information on additional time periods in treatment, as well as patient functioning post-DBT treatment.

Given the lack of currently available research in these settings, this study aimed to contribute to the understanding of DBT's effectiveness among forensic patients housed in a maximum-security hospital setting. Patients participating in DBT treatment at the Center for Forensic Psychiatry were assessed via behavioral outcomes and self-assessment measures aligned with the start of treatment and skills-training cycles. It was hypothesized that patients would experience fewer self-reported mental health symptoms and have greater perceived ability to cope with day-to-day problems, both of which were supported by the research results. While support was inconclusive for patient DBT knowledge of mindfulness and distress tolerance skills, the data indicate an overall positive effect in the amount of DBT skill knowledge gained. Finally, it was hypothesized that patients would use fewer PRN medications and have fewer incident reports as they spent more time in DBT treatment. The results of the current study partially supported this: PRN use and incidents of assault decreased significantly; however, instances of behavioral dyscontrol did not reach significance. Taken together, the research findings suggest that DBT is an effective treatment for improving outcomes and safety in an inpatient forensic setting.

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