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Brief Cognitive Behavioral Therapy for Suicidal Inpatients
A Randomized Clinical Trial

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IMPORTANCE Suicide risk is elevated after discharge from inpatient level of care. Empirically supported inpatient suicide prevention treatments are needed.

OBJECTIVE To determine whether adding an inpatient version of brief cognitive behavioral therapy for suicide prevention to treatment as usual reduces postdischarge suicide attempts, suicidal ideation, and psychiatric readmissions and to determine whether substance use disorder moderates treatment effects.

DESIGN, SETTING, AND PARTICIPANTS This randomized clinical trial compared treatment as usual (n = 106) to treatment as usual plus brief cognitive behavioral therapy for inpatients (n = 94) at a private psychiatric hospital in Connecticut. Follow-up assessments were completed monthly for 6 months postdischarge. Participants were enrolled from January 2020 through February 2023. Inpatients admitted following a suicidal crisis (past-week suicide attempt or ideation with plan on admission and attempt within previous 2 years) were included. Medical records of consecutive admissions (n = 4137) were screened, 213 were study eligible and randomized, and 200 were analyzed. A total of 114 participants (57.0%) completed 6-month follow-up assessments. Data from medical records were also obtained through 6-month follow-up.

INTERVENTION Up to 4 individual sessions of brief cognitive behavioral therapy for suicide prevention designed for inpatients.

MAIN OUTCOMES AND MEASURES Suicide attempts and readmissions were assessed via blind interviews and medical record review. Suicidal ideation was assessed via self-report.

RESULTS The mean (SD) age among 200 analyzed participants was 32.8 (12.6) years; 117 participants were female and 83 were male. Brief cognitive behavioral therapy–inpatient reduced the occurrence of suicide attempt over 6 months postdischarge by 60% (odds ratio, 0.40; 95% CI, 0.20-0.80; number needed to treat, 7) in the entire patient group, and the rate of psychiatric readmissions by 71% (rate ratio, 0.29; 95% CI, 0.09-0.90) in those without a substance use disorder. The effect of treatment condition on suicidal ideation was less clear, although post hoc analyses indicated less severe suicidal ideation following brief cognitive behavioral therapy–inpatient vs treatment as usual at 1 and 2 months postdischarge.

CONCLUSIONS AND RELEVANCE Brief cognitive behavioral therapy–inpatient reduced 6-month postdischarge suicide reattempts and rate of readmissions when added to treatment as usual. Substance use disorder moderated the treatment's effect on readmission rates. Treatment effects on suicidal ideation were less clear. Implementation research is needed to facilitate dissemination. Additional research is also needed to optimize outcomes for individuals with substance use disorders.

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Visual Abstract

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Supplemental content

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Suicide rates have increased over the past 2 decades[1] and reached an estimated all-time high in 2022 when nearly 50 000 individuals in the US died by suicide.[2] Suicidal crisis is a common reason for admission to psychiatric inpatient settings,[3] which provide a safe environment while stabilizing acute suicide risk. Optimizing suicide prevention care during inpatient stays is crucial, given that the postdischarge period is one of the highest risk times for suicide attempt and death.[4] Risk of death by suicide is particularly elevated among patients admitted for suicidal ideation or behavior and within the first 3 months of discharge.[5] The inpatient setting presents opportunities for delivering suicide-specific psychosocial interventions given the secure environment, continuous access to treatment professionals, and reduction in daily stressors and responsibilities. It is also important to leverage the inpatient stay to provide access to suicide prevention treatment, given high variability in treatment engagement postdischarge.[6]

Outpatient psychosocial interventions are efficacious for suicide prevention,[7,8] with larger effects found for suicide-specific treatments.[9] However, current evidence for inpatient suicide prevention treatments is limited.[10] Given short lengths of stay, brief interventions[11] are needed. Postadmission cognitive therapy,[12,13] which was adapted from cognitive therapy for suicide prevention[14,15] to be administered in up to 6 sessions, did not reduce suicidal behaviors postdischarge compared with usual care.[13] An inpatient version[16] of the Collaborative Assessment and Management of Suicidality,[17] using up to 9 sessions, resulted in fewer suicide attempts than enhanced usual care over 1 but not 5 months of follow-up.[16] However, the rate of suicide events (n = 8) was too small to draw conclusions about efficacy. In a pilot open trial (n = 6), Diefenbach and colleagues[18] demonstrated promising outcomes (no suicide attempts over 3-month follow-up) of a 10-session version of brief cognitive behavioral therapy for suicide prevention adapted for an inpatient setting (BCBT-inpatient).[19] However, the 10-session protocol was deemed not feasible, as only 4 sessions were completed on average.

Substance use disorder (SUD) is a common diagnosis among suicidal inpatients.[20] Substance use is also associated with suicide attempt,[21] impacting both long- and short-term risk.[22] Although participants with SUDs are typically excluded from suicide prevention research, available data from clinical trials in this patient population suggests only small treatment effects.[23] It is therefore important to include participants with SUDs in inpatient suicide prevention trials, as well as determine the moderating effects of SUDs on treatment response.

To our knowledge, this study is the largest randomized clinical trial to date for inpatient suicide prevention. The aim was to determine the efficacy of adding a 4-session BCBT-inpatient intervention to treatment as usual (TAU) for reducing suicide attempt, ideation, and psychiatric readmission over 6-month follow-up, and to test the moderating effects of SUDs. It was predicted that, relative to TAU alone, participants receiving BCBT-inpatient would experience fewer suicide attempts, less intense suicidal ideation, and fewer psychiatric readmissions over 6 months postdischarge. It was further predicted that these treatment effects would be attenuated by SUD diagnosis.

Key Points

Question Does adding an inpatient version of brief cognitive behavioral therapy for suicide prevention to treatment as usual reduce suicide attempts, suicidal ideation, and psychiatric readmissions over 6 months postdischarge?

Findings In this randomized clinical trial analyzing 200 suicidal inpatients, adding brief cognitive behavioral therapy significantly reduced the odds of postdischarge suicide attempts, and the rate of psychiatric readmissions was reduced in participants without substance use disorders. Effects on suicidal ideation were less clear.

Meaning The findings indicate that adding an inpatient version of brief cognitive behavioral therapy for suicide prevention improved patient outcomes over current standard of care alone.

Methods

Procedure

The trial protocol is available in Supplement 1. Study procedures were approved by the hospital institutional review board. Eligible participants were identified through electronic medical record review of inpatient admissions followed by attending psychiatrist consultations. Participants provided written informed consent prior to study procedures. At intake, doctoral-level assessors administered a semistructured interview[31] to determine diagnoses, including presence of SUD, and the Columbia Suicide Severity Rating Scale[25] to confirm study eligibility. Outcome assessments were completed within a mean (SD) 1.77 (3.33) days of discharge, and then remotely via telephone and online assessments monthly for 6 months. Blinded clinician-rated outcome assessments were completed by licensed psychologists. Participants completed the Adult Suicidal Ideation Questionnaire[26] electronically.[32] Participants were reimbursed up to $50 for each outcome assessment. The Consolidated Standards of Reporting Trials (CONSORT) reporting guideline was followed. Additional study procedures are outlined in the eMethods in Supplement 2.

Participants

Participants were recruited from inpatient units of a private psychiatric hospital in Connecticut from January 2020 through February 2023. Eligibility criteria included age 18 to 65 years and either suicide attempt within 1 week of admission or ideation with plan on admission as well as suicide attempt within 2 years. Exclusion criteria were current mania; lifetime schizophrenia, schizoaffective disorder, intellectual disability, or organic brain disease; electroconvulsive therapy (ECT) included in the inpatient treatment plan; expected length of stay fewer than 4 business days; unwilling or unable to follow study procedures; not fluent in English; or any other medical or psychiatric condition that would preclude informed consent or ability to participate in the study. Study-eligible participants (n = 213) were randomly assigned via a computer-generated stratified block (on current SUD diagnosis) randomization schedule to either BCBT-inpatient or TAU. Nine participants

were excluded in the BCBT-inpatient group (8 did not complete at least 1 treatment session and 1 started ECT) and 4 were excluded in the TAU group (all of whom started ECT), resulting in a final sample size of 200 (94 in BCBT-inpatient and 106 in TAU). Additional details on participant flow are reported in **Figure 1.**[24]

Outcomes

Presence and number of suicide attempts (self-destructive behavior with intent to die) were assessed using the Columbia Suicide Severity Rating Scale and electronic medical record review. Actual (attempt is enacted) or interrupted (attempt is prevented by an outside circumstance) were included in the current study. Aborted attempts were not included, as these are defined by the individual themselves preventing the attempt.

Suicidal ideation was assessed using the Adult Suicidal Ideation Questionnaire. Any-cause psychiatric inpatient readmissions were assessed via interview using the Cornell Services Index-Short Form[27] and the electronic medical record.

Treatment Conditions

TAU consisted of 24-hour multidisciplinary care based on a short-term stabilization model. Consistent with the Zero Suicide initiative[28] and current guidelines,[29] safety planning and care connection calls were administered as part of usual care.

BCBT-inpatient consisted of up to 4 (depending on time to discharge) individual therapy sessions. Session content was adapted from Bryan and Rudd's manual,[30] and based on pilot work,[18] further adapted for the current study. Treatment sessions included the following components: narrative assessment and review of suicide attempt stories, crisis response plan, inventorying reasons for living, creation of a hope kit, reducing access to lethal means, developing coping cards, and relapse prevention (see the eMethods in Supplement 2 for session content details).

Statistical Analysis

This sample size was selected to provide at least 80% power (see Supplement 1 for additional details of a priori power analyses). Descriptive statistics were calculated prior to statistical analysis. Data on quantitative variables were checked for normality using normal probability plots. Since data on suicide attempts and hospital readmissions were categorical, highly skewed, and could not be transformed to normality, generalized linear models for count data (with negative binomial distribution to account for extra dispersion) and for binary data (logistic models), and generalized estimating equations for longitudinal data were used for these outcomes. Mixed-effects models[33,34] were used to compare treatments for repeatedly measured suicidal ideation outcomes. The fixed factors in the models included treatment (BCBT-inpatient vs TAU), SUD diagnosis at baseline (yes vs no), and time (only for repeated outcomes). All possible interactions were assessed in each model but when the interactions were nonsignificant or if model nonconvergence was encountered, interactions involving SUD were dropped from the models. In the count and binary data models with repeated measures, compound symmetry working variance-covariance structure was used. In the mixed-effects models we considered different error structures and selected the best-fitting structure based on the Schwartz bayesian information criterion. Tests of effect slices and focused comparisons were used to explain significant effects in the models. All statistical testing was performed at $\alpha = .05$. Number needed to treat was calculated based on the proportion estimates in the treatment groups from the final models for suicide attempts (yes vs no, over the entire follow-up period) and for readmission (yes vs no, over the entire follow-up period, in the non-SUD group).

Results

Group Comparisons

The mean (SD) age among 200 analyzed participants was 32.8 (12.6) years; 117 participants were female and 83 were male. Full demographic and clinical characteristics are reported in **Table 1**. Diagnostic subcategory descriptive data are reported in eTable 1 in Supplement 2. TAU services are reported in **Table 2.**

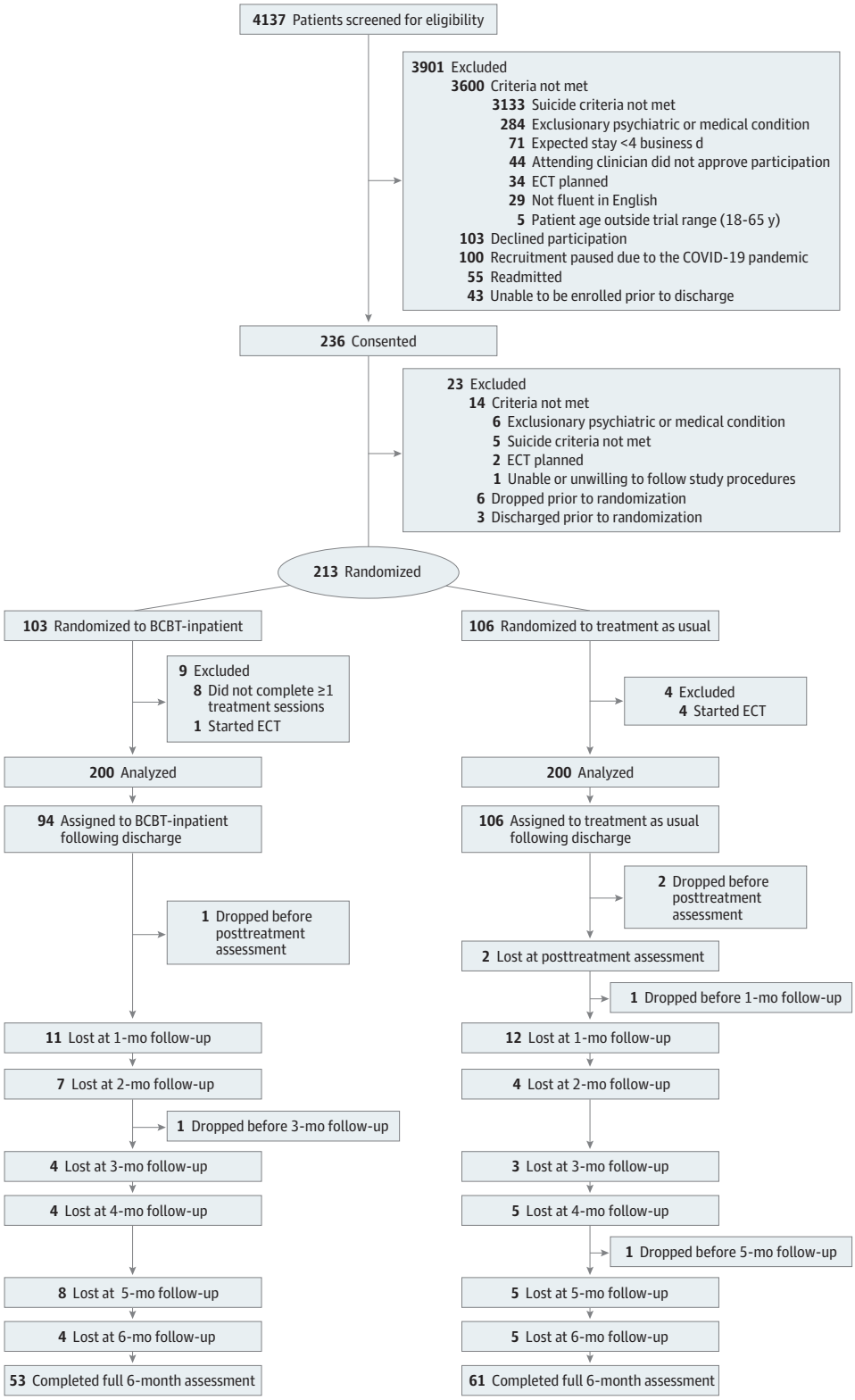
Attrition

Attrition data are reported in Figure 1. Demographic and clinical characteristics of participants who did vs did not complete the study are displayed in eTable 2 in Supplement 2. More than half of participants completed 6-month follow-up assessments. Remaining participants were mostly lost to follow-up. Two participants in the BCBT-inpatient condition (2.13%) and 4 in the TAU condition (3.77%) withdrew from study participation. There were 2 participant deaths (included in the lost to follow-up summary in Figure 1), 1 in each treatment condition. Official cause of death was not available, although 1 was reported as a death by suicide (BCBT-inpatient), while the other was reported as due to a medical event (TAU). The groups did not differ significantly as to when the final assessment was performed by our team ($F_{1,170} = 1.53$; $P = .22$; mean follow-up visits [standard error of the mean], 5.18 [0.17] in the TAU and 4.88 [0.17] in the BCBT-inpatient group). Time of final assessment was a nonsignificant predictor in all models and hence was dropped from final models.

Suicide Attempts

There were no significant effects of time in any analysis of suicide attempts. See eTable 3 in Supplement 2 for counts by time point. The interaction between treatment condition and SUD status was not statistically significant ($\chi^2_1 = 2.50$; $P = .11$) and was dropped from the model. The condition main effect was significant ($\chi^2_1 = 7.03$; $P = .008$). The estimated odds of suicide attempt over 6-month follow-up in the BCBT-inpatient group were 60% lower than in the TAU group (odds ratio [OR], 0.40; 95% CI, 0.20-0.80) controlling for SUD status. There was also a significant main effect of SUD status ($\chi^2_1 = 4.86$; $P = .03$) with the odds of suicide attempt significantly higher for those with an SUD (OR, 2.21; 95% CI, 1.07-4.58). The number needed to treat (controlling for SUD status) was 7.

Figure 1. CONSORT Diagram



BCBT-inpatient indicates brief cognitive behavioral therapy for suicide prevention, adapted for an inpatient setting; ECT, electroconvulsive therapy.

The interaction between treatment condition and SUD status was not significant ($\chi^2_1 = 0.20$; $P = .66$) and was dropped from the model. The condition main effect was significant ($\chi^2_1 = 7.86$; $P = .005$). The estimated rate of suicide attempts in

Table 1. Demographic[a] and Clinical Characteristics by Group

Characteristic	No. (%)[b]			χ^2	*P* value
	Total (N = 200)	BCBT (n = 94)	TAU (n = 106)		
Sex assigned at birth					
Female	117 (58.5)	58 (61.7)	59 (55.7)	0.75	.39
Male	83 (41.5)	36 (38.3)	47 (44.3)		
Gender identity					
Female	104 (52.0)	51 (54.3)	53 (50.0)	0.01	.91
Male	74 (37.0)	31 (33.0)	43 (40.6)		
Gender diverse	19 (9.5)	9 (9.6)	10 (9.4)		
Ethnicity[c]					
Hispanic	50 (25.0)	21 (22.3)	29 (27.4)	0.45	.50
Not Hispanic	141 (70.5)	67 (71.3)	74 (69.8)		
Race[c]					
Black	30 (15.0)	13 (13.8)	17 (16.0)	2.18	.14
American Indian or Alaska Native	2 (1.0)	1 (1.1)	1 (0.9)		
Asian	2 (1.0)	1 (1.1)	1 (0.9)		
Multiracial	8 (4.0)	3 (3.2)	5 (4.7)		
Native Hawaiian or Pacific Islander	1 (0.5)	0	1 (0.9)		
White	123 (61.5)	62 (66.0)	61 (57.5)		
Other (not specified)	28 (14.0)	10 (10.6)	18 (17.0)		
Education					
Post-high school education	106 (53.0)	51 (54.3)	55 (51.9)	0.25	.62
No post-high school education	92 (46.0)	41 (43.6)	51 (48.1)		
Employment					
Working	78 (39.0)	41 (43.6)	37 (34.9)	1.75	.19
Not working	121 (60.5)	52 (55.3)	69 (65.1)		
Relationship status					
Married or living together	34 (17.0)	18 (19.1)	16 (15.1)	0.38	.54
Not married or living together	157 (78.5)	74 (78.7)	83 (78.3)		
Houseless					
Yes	47 (23.5)	23 (24.5)	24 (22.6)	0.09	.76
No	138 (69.0)	64 (68.1)	74 (69.8)		
Admission status					
Voluntary	167 (83.5)	76 (80.9)	91 (85.8)	0.90	.34
Involuntary	33 (16.5)	18 (19.1)	15 (14.2)		
Annual household income, $[d]					
>30 000	66 (33.0)	33 (35.1)	33 (31.1)	0.14	.71
≤30 000	102 (51.0)	48 (51.1)	54 (50.9)		
Suicide attempt method					
Overdose	134 (67.0)	65 (69.1)	69 (65.1)	0.37	.54
Cutting/stabbing	21 (10.5)	9 (9.6)	12 (11.3)		
Firearm	2 (1.0)	0	2 (1.9)		
Jumping	8 (4.0)	6 (6.4)	2 (1.9)		
Vehicle crash	5 (2.5)	0	5 (4.7)		
Hanging	10 (5.0)	5 (5.3)	5 (4.7)		
Traffic/train	3 (1.5)	0	3 (2.8)		
Suffocation/strangulation	5 (2.5)	2 (2.1)	3 (2.8)		
Multiple methods	5 (2.5)	2 (2.1)	3 (2.8)		
Other[e]	7 (3.5)	5 (5.3)	2 (1.9)		
Age, mean (SD), y	32.8 (12.6)	33.1 (12.4)	32.5 (12.8)	*t* = 0.32	.75
Length of stay, mean (SD), d	12.29 (6.4)	12.3 (6.2)	12.3 (6.6)	*t* = 0.04	.97

(continued)

Table 1. Demographic[a] and Clinical Characteristics by Group (continued)

Characteristic	No. (%)[b] Total (N = 200)	BCBT (n = 94)	TAU (n = 106)	χ^2	*P* value
Diagnostic category					
Depressive	136 (68.0)	69 (73.4)	67 (63.2)	2.38	.12
Bipolar and related	48 (24.0)	18 (19.1)	30 (28.3)	2.29	.13
Trauma/stressor related	86 (43.0)	40 (42.6)	46 (43.4)	0.01	.90
Anxiety	100 (50.0)	49 (52.1)	51 (48.1)	0.32	.57
Obsessive-compulsive and related	39 (19.5)	12 (12.8)	27 (25.5)	5.12	.02
Substance use	120 (60.0)	56 (59.6)	64 (60.4)	0.01	.91
Other diagnostic category[f]	39 (19.5)	16 (17.0)	23 (21.7)	0.69	.40

Abbreviations: BCBT-inpatient, brief cognitive behavioral therapy for suicide prevention, adapted for an inpatient setting; TAU, treatment as usual.

[a] Demographic data were collected via self-report and/or medical record review. Group comparisons: gender identity (cis vs gender diverse), race (White vs historically marginalized groups), suicide attempt method (overdose vs all others), diagnostic category (presence vs absence).

[b] Number and percentages do not equal totals due to missing data, "other" responses, and/or prefer not to answer responses.

[c] Race and ethnicity data were reported to assess the representativeness of the study sample.

[d] Annual income category grouped by above vs below median.

[e] Other suicide attempt methods included exposure/hypothermia, poisoning (eg, alcohol, carbon monoxide, rat poison), refusing life-saving medical attention, and starving.

[f] Other diagnostic categories included schizophrenia spectrum disorders, feeding/eating disorders, somatic symptom disorders, and neurodevelopmental disorders.

Table 2. Treatment as Usual Services by Treatment Condition

Services	No. (%)[a] Total (N = 200)	BCBT-inpatient (n = 94)	TAU (n = 106)	χ^2	*P* value
Inpatient					
Pharmacotherapy					
Antidepressants	177 (88.5)	84 (89.4)	93 (87.7)	0.04	.83
Antimanics/antipsychotics	181 (90.5)	83 (88.3)	98 (92.5)	1.63	.20
Anxiolytics	58 (29.0)	22 (23.4)	36 (34.0)	2.84	.09
Stimulants	9 (4.5)	5 (5.3)	4 (3.8)	0.26	.60
ADHD nonstimulants	25 (12.5)	16 (17.0)	9 (8.5)	3.24	.07
Dependency treatments[b]	22 (11.0)	9 (9.6)	13 (12.3)	0.39	.53
Psychosocial services					
Supportive therapy/peer support	167 (83.5)	79 (84.0)	88 (83.0)	0.00	>.99
Pet therapy	69 (34.5)	35 (37.2)	34 (32.1)	0.53	.55
Process group	106 (53.0)	46 (48.9)	60 (56.6)	1.34	.25
Therapy/skill groups	156 (78.0)	73 (77.7)	83 (78.3)	0.05	.86
Leisure/recreational therapy	156 (78.0)	78 (83.0)	78 (73.6)	2.34	.16
Cognitive behavioral intervention	124 (62.0)	58 (61.7)	66 (62.3)	0.03	.88
Individual therapy	87 (43.5)	41 (43.6)	46 (43.4)	0.00	>.99
Family/couples intervention	37 (18.5)	15 (16.0)	22 (20.8)	0.81	.46
Substance use intervention	9 (4.5)	4 (4.3)	5 (4.7)	0.03	>.99
Other[c]	22 (11.0)	11 (11.7)	11 (10.4)	0.08	.82
Postdischarge					
Pharmacotherapy					
Antidepressants	162 (81.0)	81 (86.2)	81 (76.4)	2.20	.13
Antimanics/antipsychotics	158 (79.0)	75 (79.8)	83 (78.3)	0.00	.97
Anxiolytics	30 (15.0)	14 (14.9)	16 (15.1)	0.01	.90
Stimulants	21 (10.5)	10 (10.6)	11 (10.4)	0.00	.98
ADHD nonstimulants	23 (11.5)	11 (11.7)	12 (11.3)	0.00	.98
Dependency treatments[b]	39 (19.5)	19 (20.2)	20 (18.9)	0.04	.85
Any psychotherapy	158 (79.0)	78 (83.0)	80 (75.5)	0.57	.44

Abbreviations: ADHD, attention-deficit/hyperactivity disorder; BCBT-inpatient, brief cognitive behavioral therapy for suicide prevention, adapted for the inpatient setting; TAU, treatment as usual.

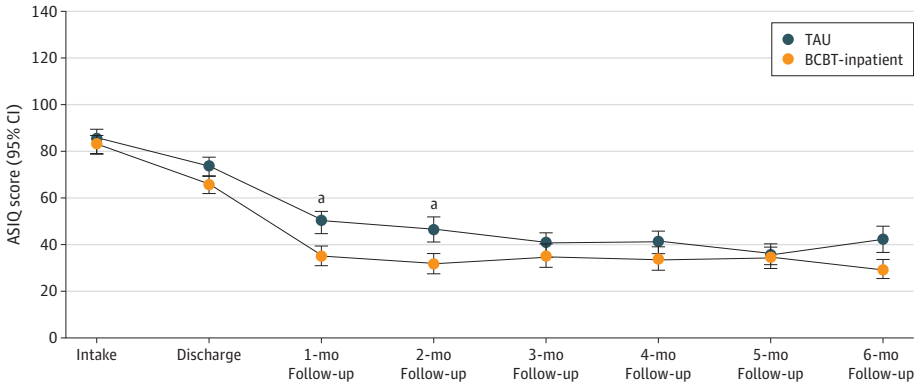
[a] Data were missing for 3 participants (1 in BCBT-inpatient and 2 in TAU) due to study withdraw prior to discharge.

[b] Dependency treatments included alcohol oxidation inhibitors, opioid analgesics, opioid antagonists, partial opioid antagonists, and γ-aminobutyric acid analogues.

[c] Other interventions included integrative therapy group, laughing group, interpersonal therapy, insight-oriented group, self-care/wellness group, mental health topics group, clinical group therapy, vocational therapy, and spiritual counseling.

the BCBT-inpatient group (mean [SD], 0.26 [0.69]; median [range], 0 [0-4]) was 61% lower than the rate of suicide attempts in the TAU group (mean [SD], 0.66 [1.32]; median [range], 0 [0-7]) (rate ratio [RR] estimate, 0.39; 95% CI, 0.20-

Figure 2. Adult Suicidal Ideation Questionnaire (ASIQ) Total Scores by Treatment Condition and Time



BCBT-inpatient indicates brief cognitive behavioral therapy for suicide prevention, adapted for an inpatient setting; TAU, treatment as usual.

[a]*P* < .05.

0.75) controlling for SUD status. There was also a significant main effect of SUD status (χ^2_1 = 4.92; *P* = .03) with the rate of suicide attempts significantly higher for those with an SUD (SUD: mean [SD], 0.60 [1.26]; median [range], 0 [0-7]; no SUD: mean [SD], 0.28 [0.74]; median [range], 0 [0-4]; RR, 2.15; 95% CI, 1.10-4.24).

Suicidal Ideation

Adult Suicidal Ideation Questionnaire scores are displayed in **Figure 2**. There were no significant interactions involving SUD status and hence the final model includes only the main effect of SUD status. In the final model, there were significant main effects of treatment condition ($F_{1,220}$ = 4.27; *P* = .04) and time ($F_{7,753}$ = 45.22; *P* < .001), but no significant condition by time interaction ($F_{7,753}$ = 1.51; *P* = .16). The main effect of treatment condition indicated that Adult Suicidal Ideation Questionnaire scores were on average lower for those in the BCBT-inpatient group vs TAU. Scores at all follow-up assessments were significantly lower than at baseline and posttreatment, and scores at posttreatment were significantly lower than at baseline across treatment conditions and SUD status. Post hoc analyses indicated that participants in the BCBT-inpatient group reported significantly lower Adult Suicidal Ideation Questionnaire scores than did participants in TAU during 1- and 2-month follow-up assessments only.

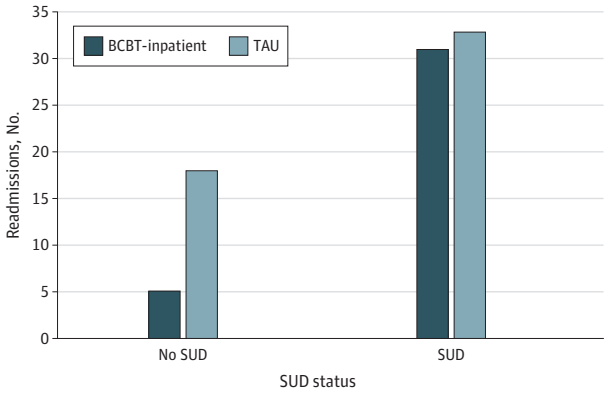
Psychiatric Readmissions

There were no significant effects of time in any analysis of readmission. See eTable 4 in Supplement 2 for counts by time point. The interaction between treatment condition and SUD status was not statistically significant (χ^2_1 = 3.66; *P* = .06). The condition main effect was also not statistically significant (χ^2_1 = 3.50; *P* = .06). The estimated odds of readmission in the BCBT-inpatient group were 73% lower than those in the TAU group for those without an SUD (OR, 0.27; 95% CI, 0.09-0.85), whereas there were no significant differences between conditions among those with an SUD (OR, 1.02; 95% CI, 0.46-2.24). The number needed to treat in the non-SUD group was 6.

Number of Readmissions

The interaction between treatment condition and SUD status was significant (χ^2_1 = 3.92; *P* = .05), although the condition main effect was not (χ^2_1 = 3.23; *P* = .07). There was a statistically significant main effect of SUD status (χ^2_1 = 6.56; *P* = .01). The estimated rate of readmissions in the BCBT-inpatient group (mean [SD], 0.13 [0.34]; median [range], 0 [0-1]) was 71% lower than the rate of readmissions in the TAU group (mean [SD], 0.45 [0.75]; median [range], 0 [0-3]) for those without an SUD (RR, 0.29; 95% CI, 0.09-0.90), whereas the rate of readmissions did not differ between treatment conditions for those with an SUD (BCBT-inpatient: mean [SD], 0.57 [1.09]; median [range], 0 [0-5]; TAU: mean [SD], 0.54 [0.96]; median [range], 0 [0-4]; RR, 1.06; 95% CI, 0.55-2.06) (**Figure 3**).

Figure 3. Number of Readmissions by Treatment Condition and Substance Use Disorder (SUD) Status



BCBT-inpatient indicates brief cognitive behavioral therapy for suicide prevention, adapted for an inpatient setting; TAU, treatment as usual.

Discussion

Stabilization is the predominant model of inpatient treatment for suicidal crises. The significantly elevated risk of subsequent death by suicide, particularly in the immediate months after discharge[5] underscores calls for changes to the current health care system.[35] Results of this randomized

clinical trial indicate that an expanded suicide-specific psychosocial intervention, specifically BCBT-inpatient, can provide additional therapeutic value toward maintaining safety after discharge. Relative to TAU (which in this study included safety planning and caring contacts), the addition of BCBT-inpatient reduced the odds of suicide attempt by 60% over 6 months postdischarge. The rate of psychiatric readmissions was also reduced by over 70%, but only in participants without SUDs. These data provide support for BCBT-inpatient as an efficacious inpatient suicide prevention treatment.

The current study significantly advances the current evidence base. A 2021 review and meta-analysis concluded there was no empirical support for psychosocial interventions to reduce either suicide attempts or ideation postdischarge.[10] However, prior studies were primarily pilots utilizing small samples. The current randomized clinical trial demonstrating efficacy of BCBT-inpatient is the largest and most definitive to date. Results are also consistent with the efficacy of outpatient BCBT to reduce suicide attempts.[36] Treatment effects on suicidal ideation were less clear. Although participants in BCBT-inpatient reported lower suicidal ideation on average, improvements in suicidal ideation across time were similar for both treatment conditions. This finding is consistent with previous inpatient suicide prevention trials.[12,13,16] Longer treatment duration or additional treatment components (eg, cognitive therapy and emotion regulation skills training) may be needed to obtain larger improvements in suicidal ideation.

This study also found weaker treatment effects in patients diagnosed with SUDs. Specifically, the rate or odds of suicide attempt in participants with SUDs was more than double that of participants without SUDs. However, SUD treatment moderation occurred only for psychiatric readmissions. BCBT-inpatient reduced the rate of readmission by more than 70% in participants without SUDs, whereas there was no significant difference for rate of readmissions in those with SUDs. These findings are consistent with previous research identifying SUD as a suicide risk factor[21] and poor prognostic indicator.[23] However, the underlying cause is not established,[37] and initial efforts to tailor suicide prevention treatments for patients with SUDs have not demonstrated improved outcomes over TAU.[38] Research is needed to disentangle the complex and bidirectional interplay between substance use and its medical, social, and psychiatric correlates[22,37] to inform the development of SUD-specific treatment enhancements in the future.

The inpatient setting presents many challenges for suicide prevention implementation.[39] In addition to short lengths of stay, workflows can be chaotic, with frequent, often abrupt changes in schedules and discharge plans. Burdensome workloads within the context of understaffing and high clinical acuity taxes personnel resources, and physical space is also often limited. Treatment in the current study was administered on an individual basis by PhD-level research staff with expertise in cognitive behavioral therapy as well as specialized training in BCBT-inpatient. Dissemination of this treatment protocol may not be possible without substantial hospital investment, for example, by creating new positions for specialist suicide prevention staff, who have been trained to administer the BCBT-inpatient protocol with high fidelity.[40] This recommendation is further complicated by the current day-rate reimbursement structure of inpatient care, which would not provide additional payments for these specialized services. Alternatively, adaptations to the current BCBT-inpatient protocol, such as administration by nonexpert clinicians, utilizing a group format, or integrating the use of technology such as mobile applications, may be needed before widespread uptake can occur. Outpatient BCBT has been found to be cost-effective[41]; however, future research will need to determine the cost-effectiveness of the current protocol as well as alternate formats for BCBT-inpatient.

Limitations

The study sample was more diverse than in previous research (eg, inclusion of patients with SUDs, including dependence); however, generalizability may still be limited to hospitals serving patients with similar demographic and clinical profiles. Despite concerted retention efforts, loss to follow-up attrition in the current study was still high. This limitation was mitigated somewhat by use of the electronic medical record to supplement self-reported suicide attempt and readmission data and mixed multilevel modeling statistics to account for remaining missing data. Enrollment for this study began in early 2020, and thus was conducted during the height of the COVID-19 pandemic. In addition to periodic shutdowns of recruitment secondary to COVID-19, the impact of COVID-19–related changes to the inpatient milieu, workflows (eg, masking and social distancing), and participant flow or eligibility on study results is unknown. Death records were not available for analysis, and thus the efficacy of BCBT-inpatient on preventing death by suicide could not be determined. Given overlap in treatment components of BCBT-inpatient with other cognitive behavioral suicide prevention protocols, no conclusions can be drawn about the specificity of BCBT-inpatient treatment effects. Comparative randomized clinical trials are needed to evaluate whether BCBT-inpatient is superior to alternative inpatient suicide prevention treatments. Future studies are also needed to determine the durability of results past 6 months postdischarge. Results are also limited to patients with prior suicide attempts. Given that more than half of individuals who die by suicide do so following their first suicide attempt,[42] it will be essential to determine the efficacy of BCBT-inpatient on preventing initial attempts as well as reattempts.

Conclusions

Given recent evidence that postdischarge suicide rates have not improved over the past 50 years[5] it is time for the field to shift to new treatment models for inpatient suicide prevention.[35] Results from the current study provide evidence that expanded, targeted, psychosocial interventions such as BCBT-inpatient may provide a pathway toward a new inpatient standard of care.

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