Mindfulness-Based Cognitive Therapy for Preventing Suicide in Military Veterans: A Randomized Clinical Trial

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ABSTRACT

Objective: This study evaluated whether Mindfulness-Based Cognitive Therapy for Preventing Suicide Behavior (MBCT-S) effectively augmented treatment-as-usual enhanced for suicide prevention (eTAU).

Methods: From December 2013 through March 2018, veterans (N = 140) at high risk for suicide were recruited mostly (88.6%) during a suicide-related inpatient admission and randomly assigned to either (1) eTAU augmented with MBCT-S or (2) eTAU only. MBCT-S began during inpatient treatment (2 individual sessions emphasizing safety planning) and continued post-discharge (8 group sessions emphasizing mindfulness skills and elaborated safety planning). Four follow-up evaluations occurred over 12 months, and primary outcomes were (1) time to suicide event and (2) number of suicide events. Secondary outcomes were time to and number of suicide attempts, proportion with acute psychiatric hospitalization, and change in suicide-related factors (eg, depression, hopelessness, suicidal ideation).

Results: Relative to eTAU, MBCT-S did not significantly delay time to suicide event (hazard ratio = 0.86; 95% CI, 0.52–1.41; $P = .54$), but did reduce total number of suicide events (MBCT-S: 56 events; eTAU: 92 events; incident rate ratio = 0.59; 95% CI, 0.36-0.99; $P < .05$). There were no significant differences in time to or number of suicide attempts. In a post hoc analysis, however, MBCT-S significantly reduced the proportion of participants attempting suicide ($P < .05$). MBCT-S also reduced the proportion with a psychiatric hospitalization. No significant between-group differences emerged on any suicide-related factors.

Conclusions: Adding MBCT-S to system-wide suicide prevention efforts produced mixed findings on the primary outcome (suicide events) and promising findings on other important outcomes (suicide attempts, psychiatric hospitalizations). MBCT-S should continue to be examined in future research.

Trial Registration: ClinicalTrials.gov identifier: NCT01872338

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For approximately two decades, suicides have been increasing in the United States,[1] with veterans having a higher rate (28 per 100,000) than the overall US population (18 per 100,000).[2] Reaching a level of national crisis, a high-priority search is underway for treatments that effectively reduce suicide attempts, especially among veterans. The current evidence base of treatments to prevent suicide is limited to a few psychopharmacologic agents,[3] psychotherapies,[4,5] and brief interventions.[6] As reflected in systematic reviews,[7,8] the evidence base in military populations is even smaller,[6,9,10] and treatments effective with civilians have been more challenging in military populations.[11] A robust response to the suicide crisis requires a significantly expanded toolkit of effective treatments.[12] Treatments focusing on high-risk populations are especially needed, including preventing suicide among individuals recently discharged from acute psychiatric inpatient care[13,14] as well as those with recurrent suicidal behavior.[15]

Responding to this need, Mindfulness-Based Cognitive Therapy was adapted for preventing suicide behavior (MBCT-S),[16–20] given improvement of several cognitive processes related to suicide risk with mindfulness training (cognitive reactivity,[21–23] rumination,[24,25] and attentional dyscontrol[23,24,26,27]). Relative to psychotherapies with evidence to prevent suicide (eg, cognitive therapy, dialectical behavioral therapy),[4,5,9] the mindfulness training components of MBCT-S are novel in their central emphasis on acceptance (versus change), attentional control, and disengagement from suicide-related cognitive, emotional, and behavioral patterns. Also, skills for managing acute suicidal crisis were addressed by incorporating the Safety Planning Intervention (SPI),[18] which has been shown to reduce suicide behavior in veterans.[6] The SPI contains safety planning components common in other suicide prevention interventions (eg, cognitive therapy, crisis response planning).[4,10] To address the period of high suicide risk subsequent to inpatient discharge,[13,14] MBCT-S is typically initiated prior to discharge, with follow-up sessions continued post-discharge.

The current randomized clinical trial (RCT) focused on veterans at high risk for suicide (eg, previous suicide

Clinical Points

- Evidence-based interventions to reduce suicide risk in veterans are severely lacking. This study sought to determine whether a mindfulness-based intervention could reduce suicidal behavior in high-risk individuals during a high-risk period.
- A mindfulness-based intervention focused on suicide prevention may save lives by preventing suicidal behavior.

attempt) after an episode involving suicide behavior, suicide-related hospitalization, or severe suicidal ideation. The RCT examined whether MBCT-S was effective in augmenting enhanced treatment-as-usual (eTAU). Primary hypotheses were that, relative to eTAU only, eTAU augmented with MBCT-S would (1) delay time to suicide event and (2) lower the number of suicide events. Secondary hypotheses were that MBCT-S would result in a similar prevention of suicide attempts (ie, time to and number of attempts) and reduce the proportion of acute psychiatric hospitalizations. Additional hypotheses predicted that MBCT-S would improve other suicide-related factors (depression, hopelessness, suicidal ideation, distress tolerance, and suicide-related coping).

METHODS

Trial Design

This RCT had 2 arms (MBCT-S + eTAU versus eTAU only) and a 12-month observation period (ClinicalTrials.gov identifier: NCT01872338). Recruitment occurred from December 2013 through March 2018 at two Veterans Health Administration (VHA) Medical Centers. Study staff reviewed VHA electronic medical records to screen all new psychiatric inpatient admissions and outpatients designated as being at high risk for suicide. Research staff approached potentially eligible candidates to explain the study, assess interest, and conduct an informed consent procedure. If signed informed consent was provided, a baseline assessment was completed prior to randomization (within 2–4 days of consent). Participants were randomized 1:1 to (1) MBCT-S + eTAU or (2) eTAU only, stratified by VHA campus, suicide attempt within prior 2 months, and presence of psychotic symptoms. To enhance concealment, randomization occurred in randomly ordered blocks of 2, 4, and 6. The local Institutional Review Board approved and monitored the research protocol and potential serious adverse events, alongside a data safety and monitoring board. Participants received monetary compensation for each assessment completed, with amounts increasing by time point (ie, $20, $25, $30, $35, $40).

Participants

Inclusion criteria were (1) age ≥ 18 years, (2) significant suicide risk in previous 30 days (eg, suicidal ideation with intent, resulting in hospitalization or suicide behavior), and (3) high risk for suicide as determined by the VHA Suicide Prevention Coordinator (SPC) or an actual, aborted, or interrupted suicide attempt in the previous 12 months.[28] Exclusion criteria were (1) cognitive impairment likely to limit therapeutic benefit, (2) severe psychotic symptoms, (3) disorganized or disruptive behavior, (4) medical instability, and (5) past-year receipt of ≥ 2 sessions of psychotherapy with mindfulness.

Assessments

Study assessments occurred at baseline (Time 1), midtreatment (Time 2), treatment completion (Time 3), 6 months post-baseline (Time 4), and 12 months post-baseline (Time 5). Telephone follow-up assessments were utilized for participants not able to attend in person (10.2%). All raters were trained in suicide assessment and ranged from supervised mental health trainees to licensed mental health providers. Follow-up assessment raters were blind to study condition. If the blind was broken, another rater used the audio-recorded interview to generate a blind rating. The following measures were administered via interview: Mini-International Neuropsychiatric Interview (MINI),[29] Columbia Suicide Severity Rating Scale (C-SSRS),[30] and Scale for Suicide Ideation (SSI).[31] Self-report measures included the Beck Depression Inventory (BDI),[32] Beck Hopelessness Scale (BHS),[33] Suicide-Related Coping Scale (SRCS),[34] and Distress Tolerance Scale (DTS).[35]

Psychiatric diagnosis. The MINI[29] was administered at Time 1 to capture baseline diagnostic information.

Suicidal ideation and attempts. The C-SSRS[30] was used to capture worst-point suicidal ideation severity and suicide attempts occurring prior to and during the 12-month study period. If a follow-up assessment was missed, the missed period was queried during the next C-SSRS assessment. Interrater agreement was 0.96 for ideation severity and 0.89 for suicide behavior classifications. A blind panel consensus process, described elsewhere,[36] was utilized to classify ambiguous cases of suicide behavior.

Electronic medical record review. Review of participants' VHA electronic medical records coded for mental health service use during the 12 months prior to and 12 months during the study. This allowed for coding of suicide attempts and acute psychiatric hospitalizations that either were not reported during follow-up assessments or occurred during the period of a missed follow-up.

Study Outcomes

Suicide events (primary outcome). Suicide events were defined as (*a*) deliberate self-directed violence, with injury or potential for injury, with explicit/implicit evidence of suicidal intent[37]; (*b*) suicide preparatory behaviors; (*c*) aborted attempts; (*d*) interrupted attempts[28]; or (*e*) suicidal ideation resulting in acute psychiatric hospitalization or an emergency department (ED) visit. Suicide events occurring during the 12-month study period were coded based on the C-SSRS, self-reported non-VHA service use, and VHA electronic medical record.

Table 1. Participant Demographic and Clinical Characteristics[a]

Variable	MBCT-S (n = 71)	eTAU (n = 69)	*P* Value[b]
Demographic			
Age, mean (SD), y	48 (13.2)	46 (14.3)	.50
Female sex	8 (11.3)	9 (13.0)	.75
Education			.26
High school or less	22 (31.0)	27 (40.3)	
Some college	31 (43.7)	30 (44.8)	
College degree or higher	18 (25.4)	10 (14.9)	
Race/ethnicity			.42[c]
White	32 (45.1)	31 (44.9)	
Black	18 (25.4)	21 (30.4)	
Latino	14 (19.7)	15 (21.7)	
Asian, American Indian, or other	7 (9.9)	2 (2.9)	
Employment			.57[c]
Employed	15 (21.4)	19 (27.5)	
Unemployed	53 (75.7)	48 (69.6)	
Supported work therapy	0 (0)	1 (1.5)	
Student	2 (2.9)	1 (1.5)	
Marital status			.72[c]
Married/living as married	22 (31.4)	16 (23.2)	
Never married	18 (25.7)	18 (26.1)	
Separated/divorced	28 (40.0)	32 (46.4)	
Widowed	2 (2.9)	3 (4.4)	
Clinical			
Diagnosis[d]			
MDD	49 (69.0)	50 (72.5)	.65
PTSD	44 (62.0)	40 (58.0)	.63
Substance use 30-day	28 (39.4)	33 (47.8)	.32
Alcohol binge	26 (36.6)	28 (40.6)	.63
Panic disorder	11 (15.5)	6 (8.7)	.22
Bipolar disorder	7 (9.9)	10 (14.5)	.40
GAD	6 (8.5)	4 (5.8)	.74[c]
Schizoaffective	5 (7.0)	2 (2.9)	.44[c]
Social phobia	4 (5.6)	1 (1.5)	.37[c]
OCD	3 (4.2)	1 (1.5)	.62[c]
Lifetime suicide attempts			.67
None	10 (14.1)	12 (17.4)	
1	22 (31.0)	17 (24.6)	
Multiple	39 (54.9)	40 (58.0)	
Lifetime non-suicidal self-injury	25 (35.2)	20 (29.0)	.43
Past-year suicidal ideation with intent (worst-point)	65 (91.6)	60 (87.0)	.38
Recruited during inpatient treatment	61 (85.9)	63 (91.3)	.32
Past-year acute psychiatry hospitalizations			.49[c]
None	6 (8.5)	4 (5.8)	
1	45 (63.4)	39 (56.5)	
Multiple	20 (28.2)	26 (37.7)	

[a]Values are shown as n (%) unless otherwise noted. Some calculations include denominators smaller than the overall n noted due to missing responses.
[b]Age was compared using analysis of variance; χ^2 was used for all other variables.
[c]Fisher exact test.
[d]Psychiatric diagnoses are not mutually exclusive.
Abbreviations: eTAU = enhanced treatment-as-usual, GAD = generalized anxiety disorder, MBCT-S = Mindfulness-Based Cognitive Therapy for Preventing Suicide Behavior, MDD = major depressive disorder, OCD = obsessive-compulsive disorder, PTSD = posttraumatic stress disorder.

Suicide attempts (secondary outcome). Suicide attempts were defined as deliberate self-directed violence with injury or potential for injury and with explicit/implicit suicidal intent, consistent with standard definitions.[37] Suicide attempts occurring during the 12-month period were coded based on the C-SSRS assessments and VHA electronic medical record.

Acute psychiatric hospitalizations (secondary outcome). Acute psychiatric hospitalizations occurring during the 12-month study period were captured via VHA electronic medical record or self-reported non-VHA service-use.

Suicide-related factors (secondary outcomes). Depression severity was assessed using the BDI.[32] Severity of hopelessness was assessed with the BHS.[33] Suicidal ideation severity was measured using the clinician-administered SSI, which has a demonstrated interrater reliability of 0.83.[31] Suicide-related coping was measured using the self-report SRCS,[34] for which higher scores indicate more adaptive coping in response to suicidal urges.[38] Distress tolerance was assessed using the self-report DTS,[35] for which higher scores indicate a greater capacity to tolerate and adaptively cope with negative emotions.[39]

Study Conditions

eTAU. The VHA had implemented an enhanced program for veterans at high-risk for suicide,[40] where SPCs provided study participants with suicide safety planning using the Safety Planning Intervention (SPI),[18] monitored their clinical status, and attempted to engage them in a minimum number of mental health visits (ie, 4 visits within an initial 30 days and a minimum of monthly visits over 2 additional months).

MBCT-S. MBCT-S began with 2 individual sessions focused on elaborating the SPI safety plan[18] and building the rationale for mindfulness training. This was followed by 8 group-based mindfulness sessions, with subsequent optional monthly booster sessions.[19] Individual sessions were typically initiated prior to inpatient discharge, and the group sessions occurred post-discharge. MBCT-S was provided in groups based on the original format of MBCT[41] and because the connectedness fostered in group treatments may counter the isolation associated with suicide risk.[42] Sessions were 1.5–2 hours in duration (with 3–5 participants) and began with suicide risk monitoring. Mindfulness-meditation exercises[41] sought to build purposeful attention and non-judgmental, compassionate responses to difficult experiences.[43] Following each exercise, clinically driven inquiry linked the class exercise to coping with suicide-related distress.[44] Other adaptations included revisiting the safety plan systematically throughout treatment and psychoeducation about risk factors for suicide behavior, as opposed to depression as in the original MBCT protocol. Home meditation practices (3–6 different practices) were assigned weekly. MBCT-S is described in greater detail elsewhere,[19] including an MBCT-S manual (available by request).[45]

MBCT-S treatment fidelity. Fidelity was scored from randomly chosen audio recordings of 20% of MBCT-S sessions (60 sessions) using a modified adherence scale (range, 0–34),[46] by a rater (M.S.C.) not involved with administering

Table 2. Receipt of eTAU by Study Condition[a]

Variable	MBCT-S (n = 71)	eTAU (n = 69)	*P* Value[b]
Active Treatment Period (Time 1–Time 3)			
Outpatient psychotherapy[c]	30 (42.3)	28 (40.6)	.84
Outpatient medication management	37 (52.1)	37 (53.6)	.86
Outpatient substance abuse treatment	11 (15.5)	6 (8.7)	.22
DBT[c]	1 (1.4)	2 (2.9)	.62[d]
Mental health recovery day program/IOP	2 (2.8)	1 (1.5)	1.00[d]
Mental health residential care[e]	34 (47.9)	39 (56.5)	.31
SPC phone contact	27 (38.0)	17 (24.6)	.09
SPC face-to-face	14 (19.7)	14 (20.3)	.93
No mental health care	2 (2.8)	3 (4.4)	.68[d]
6 Months (Time 4)			
Outpatient psychotherapy[c]	24 (35.8)	21 (30.4)	.50
Outpatient medication management	30 (44.8)	26 (37.7)	.40
Outpatient substance abuse treatment	1 (1.5)	2 (2.9)	1.00[d]
DBT[c]	0 (0)	2 (2.9)	.50[d]
Mental health recovery day program/IOP	0 (0)	0 (0)	
Mental health residential care[e]	7 (10.5)	14 (20.3)	.11
SPC phone contact	12 (16.9)	13 (18.8)	.76
SPC face-to-face	4 (5.6)	10 (14.5)	.10[d]
No mental health care	40 (56.3)	38 (55.1)	.88
12 Months (Time 5)			
Outpatient psychotherapy[c]	31 (47.7)	29 (42.7)	.56
Outpatient medication management	41 (63.1)	38 (55.9)	.40
Outpatient substance abuse treatment	4 (6.2)	8 (11.8)	.37[d]
DBT[c]	1 (1.5)	1 (1.5)	1.00[d]
Mental health recovery day program/IOP	2 (3.1)	1 (1.5)	.61[d]
Mental health residential care[e]	10 (15.4)	19 (27.9)	.08
SPC phone contact	14 (19.7)	17 (24.6)	.48
SPC face-to-face	7 (9.9)	12 (17.4)	.19
No mental health care	28 (39.4)	28 (40.6)	.89

[a]Values are shown as n (%). In some cases, the denominator was < 140 due to study withdrawal or death.
[b]All statistical tests are χ^2 unless otherwise indicated.
[c]DBT and outpatient psychotherapy were calculated separately; categories are not mutually exclusive.
[d]Fisher exact test.
[e]Types of residential programs included those for serious mental illness, substance abuse, posttraumatic stress disorder, and homelessness; mental health residential care included psychopharmacologic treatment and counseling; receipt of any mental health did not include SPC contact.
Abbreviations: DBT = dialectic behavior therapy, eTAU = enhanced treatment-as-usual, IOP = intensive outpatient program, MBCT-S = Mindfulness-Based Cognitive Therapy for Preventing Suicide Behavior, SPC = suicide prevention coordinator.

the study assessments or treatment. Therapist adherence to original mindfulness components and suicide safety elements showed mean (SD) total score of 29.1 (4.7), which indicated good fidelity. Each MBCT-S group was led by a licensed psychologist or social worker and a cofacilitator. All therapists received a 1-week intensive MBCT-S training, personally practiced mindfulness meditation, and participated in weekly consultation calls led by a senior clinician (M.L.) to discuss adherent MBCT-S approaches to ongoing clinical issues.

Statistical Analysis

An intent-to-treat approach included all participants in the analysis, regardless of treatment or assessment attrition. The criterion of MBCT-S completion (ie, ≥ 1 individual and ≥ 4 group sessions) was based on previous MBCT RCTs.[47,48] An enrollment target of 164 was determined to achieve 80% power to detect a group difference on time to first suicide event, using a hazard ratio (HR) of 0.42 and failure probability of 32.1%.

Two primary analyses examined MBCT-S effects on suicide events. To determine the effectiveness of MBCT-S compared with eTAU for delaying time to suicide event, a Cox proportional hazard regression modeled the effects of study condition on time to the first suicide event during 12-month follow-up. Time to suicide event was coded as the number of days from randomization to first suicide event, with censoring for study withdrawal, non-suicide death, or reaching 12 months without an event. To estimate study condition effects on number of suicide events in 12 months, we used a zero-inflated negative binomial regression model, given a distribution with excessive zeroes and overdispersion. The effect of interest for this hypothesis was derived from the count model. The same analytic approach evaluated the effects of MBCT-S on suicide attempts, except a Poisson distribution was applied to examine number of attempts. A χ^2 test evaluated whether MBCT-S, relative to eTAU, led to a lower proportion of acute psychiatric hospitalizations.

To determine the effectiveness of MBCT-S compared with eTAU for changes in depression, hopelessness, suicidal ideation, distress tolerance, and suicide-related coping, separate linear mixed models were used with main effects (condition, time) and an interaction term of study condition by time. Random effects were specified for each subject nested within the two recruitment sites, with covariance structures selected based on various fit indices.

RESULTS

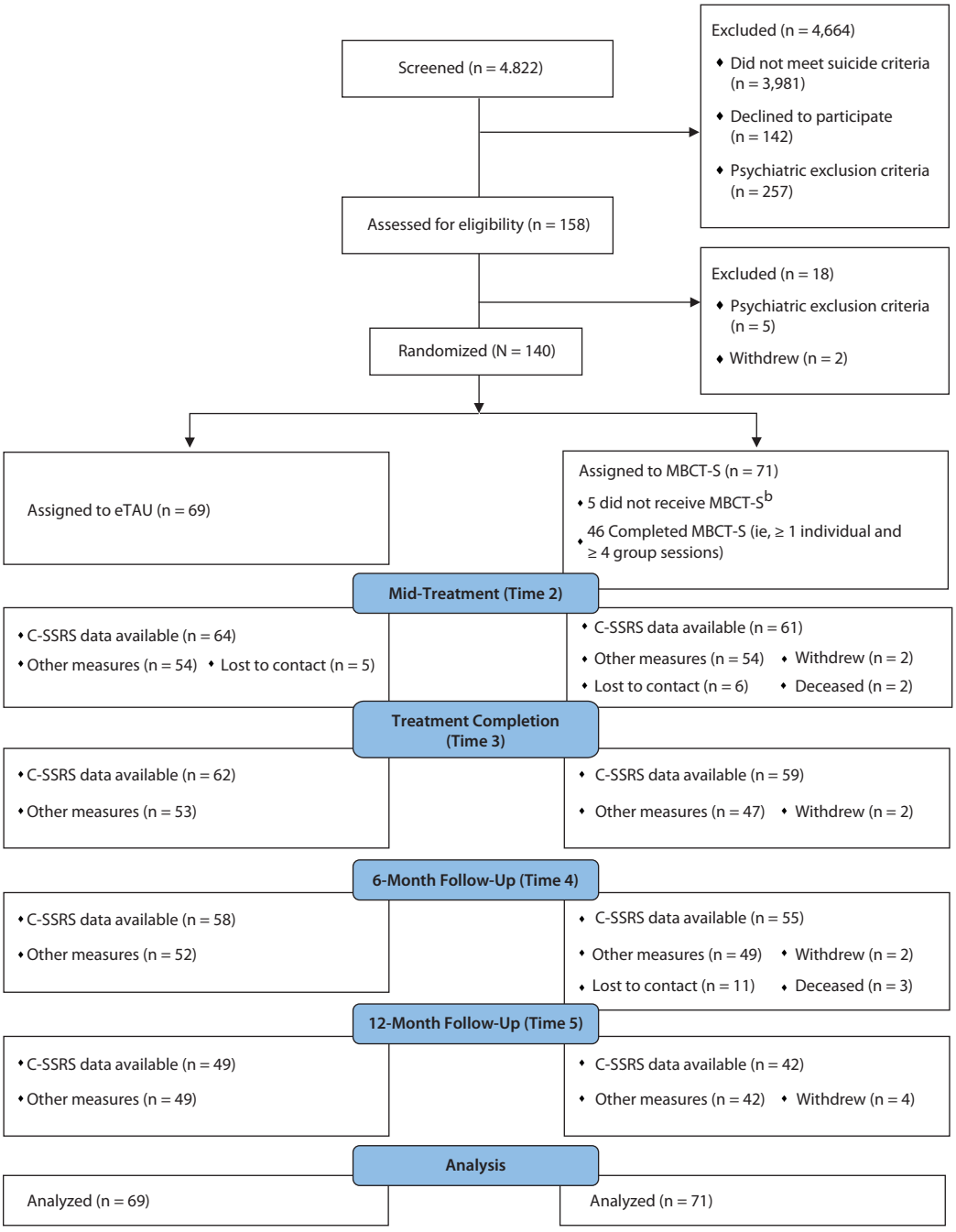
Participant Characteristics and Enhanced Treatment-As-Usual (eTAU)

Table 1 shows that 124 (88.6%) were recruited during inpatient treatment, 118 (84.3%) had a previous lifetime suicide attempt, and 79 (56.4%) had multiple lifetime suicide attempts. eTAU is summarized in Table 2 and shows high percentages of mental health treatment engagement (n = 135; 96.4%) during the active treatment period, including intensive treatment such as residential care (n = 73; 52.1%). Study conditions did not significantly differ on any demographic, diagnostic, suicide-related, or eTAU variables.

Study and Treatment Completion Rates

Study flow is summarized in Figure 1. The mean (SD) number of follow-up assessments completed out of 4 (MBCT-S: 2.82 [1.61]; eTAU: 3.03 [1.38]) and the completion rates at each follow-up did not significantly differ by condition. Among MBCT-S participants, 46 (64.8%) completed the study intervention. The mean (SD) number of MBCT-S sessions completed was 7.7 (4.6) (range, 0–18). Supplementary Table 1 presents detailed attendance information.

Figure 1. CONSORT Diagram[a]

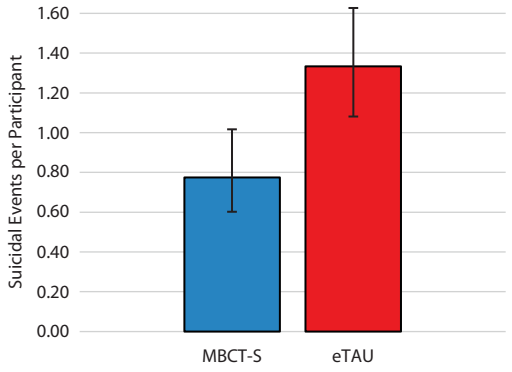


[a]If follow-up assessment was missed, a subsequent C-SSRS queried the previously missed time period. Deceased and Withdrew categories are reported cumulatively.
[b]The 5 subjects that did not engage with MBCT-S received the eTAU standard Safety Planning Intervention.
Abbreviations: C-SSRS = Columbia Suicide Severity Rating Scale, eTAU = enhanced treatment-as-usual, MBCT-S = Mindfulness-Based Cognitive Therapy for Preventing Suicide Behavior.

Suicide Events

Sixty-three (45%) participants had a suicide event (MBCT-S: n = 30 [42.3%]; eTAU: n = 33 [47.8%]). Time to suicide event during the 12 months did not significantly differ between conditions ($\chi^2 = 0.55$, HR [95% CI] = 0.86 [0.52–1.41], $P = .54$; number-needed-to-treat [NNT] = 13.3). A total of 148 suicide events occurred during the 12-month period (MBCT-S: 56 events; eTAU: 92 events), according to the following types: suicidal ideation resulting in hospitalization/ED (MBCT-S: 18 events; eTAU: 37 events), preparatory suicide behaviors (MBCT-S: 23 events; eTAU: 29 events), and suicide attempts (MBCT-S: 15 events; eTAU: 26 events). The count model showed a significantly fewer number of suicide events among MBCT-S participants,

Figure 2. 12-Month Suicide Event Rate per Participant by Study Condition



Abbreviations: eTAU = enhanced treatment-as-usual, MBCT-S = Mindfulness-Based Cognitive Therapy for Preventing Suicide Behavior.

relative to eTAU participants ($\chi^2 = 5.25$, $P = .02$). The 12-month rate of suicide events per participant was 41.4% lower in MBCT-S (Figure 2) with an incident rate ratio (IRR) of 0.59 (95% CI, 0.36–0.99).

Suicide Attempts

A total of 27 participants (19.3%) attempted suicide, inclusive of 1 MBCT-S participant who died by suicide. Time to suicide attempt did not significantly differ between conditions ($\chi^2 = 3.45$, HR [95% CI] = 0.47 [0.21–1.04], $P = .06$, NNT = 2.7). A post hoc comparison showed that a significantly lower proportion of participants in MBCT-S, relative to eTAU, attempted suicide in 12 months ($\chi^2 = 4.04$, $P = .04$; MBCT-S: n = 9 [12.7%]; eTAU: n = 18 [26.1%], NNT [95% CI] = 7.5 [3.8–208.3]). There were 41 suicide attempts during the 12 months (MBCT-S: 15 attempts; eTAU: 26 attempts), but the number of attempts did not significantly differ between the conditions (IRR [95% CI] = 0.56 [0.25–1.26]; $\chi^2 = 0.50$, $P = .48$).

Acute Psychiatric Hospitalizations

There were 103 acute hospitalizations (MBCT-S: 37 hospitalizations; eTAU: 66 hospitalizations) during the 12 months. Compared to eTAU participants, a significantly lower proportion of MBCT-S participants were hospitalized (MBCT: n = 21 [29.6%]; eTAU: n = 32 [46.4%]; $\chi^2 = 4.20$, $P = .04$, NNT [95% CI] = 6.0 [3.1–105.3]). Every 6 individuals receiving MBCT-S prevented 1 veteran from being hospitalized.

Suicide-Related Factors

Improvement across 12 months on several suicide-related scales are summarized in Table 3. Significant main effects (across both conditions) for improvement over the 12-months were observed for depression ($F = 34.11$, $P < .0001$), hopelessness ($F = 26.85$, $P < .0001$), suicidal ideation ($F = 25.97$, $P < .0001$), distress tolerance ($F = 13.05$, $P < .0001$), and suicide-relating coping ($F = 19.17$, $P < .0001$). However, no statistically significant overall effects for condition by time were observed on any of these measures.

Table 3. Changes Over Time in Suicide-Related Factors by Study Condition[a]

Factor[b]	Time 1	Time 2	Time 3	Time 4	Time 5	Overall *P* Value[c]
Depression						.54
MBCT-S	30.8 (11.2)	18.6 (12.8)	16.8 (13.9)	17.9 (13.1)	19.7 (12.9)	
eTAU	29.2 (12.2)	19.8 (13.1)	17.9 (14.5)	16.9 (11.5)	17.2 (11.5)	
P value (time × condition)		0.25	0.26	0.80	0.71	
Cohen *d*[d]		0.20 (–0.04 to 0.43)	0.19 (–0.05 to 0.42)	.04 (–0.19 to 0.28)	–0.07 (–0.30 to 0.17)	
Hopelessness						.48
MBCT-S	13.3 (5.3)	8.5 (6.6)	7.6 (6.7)	8.0 (6.9)	8.7 (6.9)	
eTAU	11.8 (5.8)	7.9 (6.4)	8.2 (6.7)	7.6 (6.5)	8.3 (6.8)	
P value (time × condition)		0.43	0.06	0.38	0.38	
Cohen *d*[d]		0.13 (–0.11 to 0.36)	0.32 (–0.08 to 0.56)	0.14 (–0.10 to 0.38)	0.17 (–0.07 to 0.40)	
Suicidal ideation						.43
MBCT-S	12.4 (9.8)	5.5 (8.0)	4.7 (7.2)	6.1 (8.7)	4.0 (6.8)	
eTAU	11.2 (10.4)	5.4 (8.5)	4.7 (7.6)	3.2 (5.8)	2.4 (5.1)	
P value (time × condition)		0.50	0.45	0.41	0.85	
Cohen *d*[d]		0.10 (–0.14 to 0.33)	0.11 (–0.12 to 0.35)	–0.13 (–0.37 to 0.10)	–0.03 (–0.26 to 0.21)	
Distress tolerance						.09
MBCT-S	2.2 (0.9)	2.6 (1.0)	2.8 (1.0)	2.9 (1.1)	2.7 (1.0)	
eTAU	2.3 (0.9)	2.6 (0.9)	2.6 (0.9)	2.7 (1.0)	2.7 (0.9)	
P value (time × condition)		0.47	0.01	0.03	0.25	
Cohen *d*[d]		–0.12 (–0.36 to 0.11)	–0.42 (–0.66 to –0.18)	–0.31 (–0.55 to –0.08)	–0.19 (–0.43 to 0.04)	
Suicide-related coping						.15
MBCT-S	64.4 (12.1)	72.2 (10.9)	74.2 (10.5)	73.3 (11.4)	72.3 (11.9)	
eTAU	64.5 (12.5)	68.5 (15.1)	69.6 (15.5)	71.4 (11.0)	72.0 (10.3)	
P value (time × condition)		0.08	0.03	0.35	0.84	
Cohen *d*[d]		–0.30 (–0.53 to –0.06)	–0.38 (–0.62 to –0.14)	–0.14 (–0.38 to 0.09)	–0.04 (–0.27 to 0.20)	

[a]Values shown as mean (SD) unless otherwise noted. Overall main effects for time were significant for all measures ($P < .001$).
[b]The following measures were used: depression: Beck Depression Inventory; hopelessness: Beck Hopelessness Scale; suicidal ideation: Scale for Suicide Ideation; distress tolerance: Distress Tolerance Scale (total score); suicide related coping: Suicide-Related Coping Scale (total score).
[c]Overall time-by-condition effect.
[d]Cohen *d* reported with 95% CIs. Negative range Cohen *d* indicates greater score increase for MBCT-S, which is the desired direction for distress tolerance and suicide-related coping.
Abbreviations: eTAU = enhanced treatment-as-usual, MBCT-S = Mindfulness-Based Cognitive Therapy for Preventing Suicide Behavior.

DISCUSSION

The current study evaluated a unique clinical approach for individuals at high-risk for suicide. While previous psychotherapies shown to reduce suicide emphasize strategies for directly changing maladaptive thoughts and/or behaviors,[4–6] MBCT-S emphasizes experiential techniques to non-judgmentally observe, accept, and shift attention away from these and other suicidal processes. This repeated practice may help weaken the association between negative mood states, suicidal thinking, and impulsive suicide behavior.[17] The current RCT evaluated the effects of adding this novel method of intervention, combined with safety planning, to system-wide suicide prevention and mental health treatment efforts. The overall observations showed a promising, though mixed, set of results.

Mixed findings were observed on the primary outcome of suicide event. MBCT-S did not delay time to suicide event but did reduce the total number of suicide events. Reduced recurrence of suicide events is a notable outcome in a high-risk cohort in whom repeated suicidal behavior is common and associated with poorer prognosis.[15]

On the secondary outcome of suicide attempt, significant effects for time to suicide attempt and number of attempts were not detected. However, two promising observations are noted. First, the time-to-attempt analysis showed a trend toward significance with a hazard ratio and NNT that were comparable to those of other cognitive-behavioral therapies for suicide.[4,9] Second, a post hoc analysis showed that, relative to eTAU participants, a significantly lower proportion of MBCT-S participants attempted suicide during the 12 months, and, in fact, the proportion making a suicide attempt was halved. Thus, MBCT-S shows promising effects for reducing the likelihood of suicide attempt, and continued research in studies with greater statistical power is needed.

On the secondary outcome of psychiatric hospitalization, MBCT-S significantly reduced the proportion of individuals hospitalized in 12 months, an important outcome with 33% of all participants having had multiple acute hospitalizations in the year before the study. Because psychiatric hospitalization indicates clinical worsening, this outcome suggests relatively greater clinical stability among MBCT-S participants. Since hospitalization was not a primary outcome, this important finding warrants additional research. If confirmed, MBCT-S hospitalization reductions would be similar to those observed with other suicide prevention psychotherapies.[5,9]

Finally, MBCT-S did not show an advantage on the suicide-related factors (eg, depression, hopelessness), as both conditions significantly improved over time on each of these outcomes. That MBCT-S reduced the number of suicide events, but did not show an advantage on the suicide-related factors, is a pattern that is broadly consistent with previous suicide prevention RCTs.[18,35] The pattern suggests that reductions in suicidal behavior do not correspond closely with improvement in symptoms, and symptom improvement may therefore be desirable but not sufficient.

eTAU included intensive treatment elements that likely minimized estimations of MBCT-S effects, thereby making the observed positive results especially notable. In addition to safety planning and clinical monitoring, the eTAU condition also showed high rates of mental health treatment engagement (94%). In fact, 57% received intensive treatment such as residential care during the active treatment period. Moreover, eTAU participants showed a near doubling of residential care at 6 and 12 months. The fact that MBCT-S improved some outcomes above and beyond this treatment context points to its promise as an augmentative intervention.

The study had limited power and enrolled only 140 out of a targeted 164 participants, despite a 1-year project extension, which likely limited the detection of statistical significance on meaningful effects. For example, time to suicide attempt produced a hazard ratio reflecting a 53% reduction of attempts, but only reached a trend toward significance ($P = .06$). Another limitation is the lack of an attention control condition. Additionally, outpatient engagement has been known to be challenging post-discharge in suicidal populations.[49,50] The MBCT-S noncompletion rate (35%) was higher than that of similar trials,[5,9] despite initiation of MBCT-S before inpatient discharge. Therefore, improvements to MBCT-S acceptability and feasibility should be studied via novel methods (eg, peer support, telehealth).

Adding MBCT-S to system-wide suicide prevention and mental health treatment efforts produced a mixed set of findings, significantly reducing one primary outcome (number of suicidal events) and showing promise on others (proportion with suicide attempt and psychiatric hospitalization). Significant findings were not observed on time to suicide event (primary outcome) or time to and number of suicide attempt(s), as well as the measures of suicide-related factors. MBCT-S uses a novel clinical approach that would expand our toolkit for reducing suicidal behavior, can be integrated with system-wide suicide prevention efforts,[12,51] and may have cost-effectiveness advantages. Given these benefits and the promising findings observed, MBCT-S should continue to be examined in future research.

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Supplementary material: Available at PSYCHIATRIST.COM

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Editor's Note: We encourage authors to submit papers for consideration as a part of our Focus on Suicide section. Please contact Philippe Courtet, MD, PhD, at pcourtet@psychiatrist.com.

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Supplementary Material

Article Title: Mindfulness-Based Cognitive Therapy for Preventing Suicide in Military Veterans: A Randomized Clinical Trial

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List of Supplementary Material for the article

1. Table 1 MBCT-S session attendance

Disclaimer

This Supplementary Material has been provided by the author(s) as an enhancement to the published article. It has been approved by peer review; however, it has undergone neither editing nor formatting by in-house editorial staff. The material is presented in the manner supplied by the author.

Supplementary Table 1. MBCT-S session attendance.

	No. (%)			
	Individual Sessions (Range 0-2)	**Group sessions (Range 0-8)**	**Booster Group Sessions (Range 0-10)**	**Total Sessions (Range 0-18)**
0	6 (8.45)	7 (9.86)	43 (60.56)	5 (7.04)
1-2	65 (91.55)	16 (22.54)	12 (16.90)	5 (7.04)
3-4	-	5 (7.04)	8 (11.27)	11 (15.49)
5-6	-	12 (16.90)	5 (7.04)	6 (8.45)
7-8	-	31 (43.66)	1 (1.41)	10 (14.08)
9-10	-	-	2 (2.82)	15 (21.13)
11-12	-	-	-	9 (12.68)
13+	-	-	-	10 (14.08)