

Research Article

A PILOT STUDY OF GROUP MINDFULNESS-BASED COGNITIVE THERAPY (MBCT) FOR COMBAT VETERANS WITH POSTTRAUMATIC STRESS DISORDER (PTSD)

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Background: “Mindfulness-based” interventions show promise for stress reduction in general medical conditions, and initial evidence suggests that they are accepted in trauma-exposed individuals. Mindfulness-based cognitive therapy (MBCT) shows substantial efficacy for prevention of depression relapse, but it has been less studied in anxiety disorders. This study investigated the feasibility, acceptability, and clinical outcomes of an MBCT group intervention adapted for combat posttraumatic stress disorder (PTSD). **Methods:** Consecutive patients seeking treatment for chronic PTSD at a VA outpatient clinic were enrolled in 8-week MBCT groups, modified for PTSD (four groups, $n = 20$) or brief treatment-as-usual (TAU) comparison group interventions (three groups, $n = 17$). Pre and posttherapy psychological assessments with clinician administered PTSD scale (CAPS) were performed with all patients, and self-report measures (PTSD diagnostic scale, PDS, and posttraumatic cognitions inventory, PTCI) were administered in the MBCT group. **Results:** Intent to treat analyses showed significant improvement in PTSD (CAPS ($t(19) = 4.8$, $P < .001$)) in the MBCT condition but not the TAU conditions, and a significant Condition \times Time interaction ($F[1,35] = 16.4$, $P < .005$). MBCT completers ($n = 15$, 75%) showed good compliance with assigned homework exercises, and significant and clinically meaningful improvement in PTSD symptom severity on posttreatment assessment in CAPS and PDS (particularly in avoidance/numbing symptoms), and reduced PTSD-relevant cognitions in PTCI (self blame). **Conclusions:** These data suggest group MBCT as an acceptable brief intervention/adjunctive therapy for combat PTSD, with potential for reducing avoidance symptom cluster and PTSD cognitions. Further studies are needed to examine efficacy in a randomized controlled design and to identify factors influencing acceptability and efficacy. *Depression and Anxiety* 30:638–645, 2013. © 2013 Wiley Periodicals, Inc.

Key words: clinical trials; life events; meditation; mindfulness; posttraumatic stress disorder (PTSD); stress; treatment

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Grant sponsor: Mind & Life Institute, Varela Award to Anthony King; TATRC; Grant number: W81XWH0820208.

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Received for publication 6 September 2012; Revised 28 January 2013; Accepted 2 March 2013

DOI 10.1002/da.22104

Published online in Wiley Online Library (wileyonlinelibrary.com).

INTRODUCTION

Stress-reduction groups involving mindfulness meditation techniques delivered as classes in health-care settings (e.g. mindfulness-based stress reduction, MBSR) and psychotherapies incorporating mindfulness techniques (e.g. mindfulness-based cognitive therapy, MBCT) have shown promise for reducing emotional distress and symptom severity across a number of psychiatric conditions with anxious and depressive symptomatology. MBSR has demonstrated durable, albeit moderate sized, effects on mental health measures of depression, anxiety, and stress when performed in “health-related” class settings.^[1] MBCT was designed to prevent the recurrence of depressive episodes in patients with chronic recurrent depression, and is associated with substantial reduction in depression recurrence over 2 years of followup.^[2–4] A subsequent version of the MBCT group-based intervention adapted for generalized anxiety disorder (GAD) has also shown significant symptom improvement,^[5] as have individual interventions for GAD integrating mindfulness meditation techniques.^[6,7]

There are theoretical reasons to expect that mindfulness-based interventions may be similarly useful in treatment of posttraumatic stress disorder (PTSD),^[8,9] and combat-related PTSD in particular.^[10] Mindfulness-based interventions strive to entrain sustained mindful attention to and acknowledgment of even unpleasant emotions or memories in a nonjudgmental manner.^[11] As previously suggested,^[9] such techniques stand diametrically opposed to the psychological processes of avoidance and suppression of painful emotions and memories, which are thought to contribute to symptom maintenance in PTSD.^[12] Accordingly, mindfulness practice in patients with anxiety disorders was conceptualized as providing a form of exposure to experience of feared thoughts and bodily states.^[6] Interestingly, in contrast to “refuting” or changing the content of negative cognitions that is typical of traditional cognitive-behavioral therapies, MBCT appears to alter one’s relationship to negative cognitions.^[13] Additionally, from a purely behavioral perspective, MBCT involves techniques similar to relaxation, and non-MBCT relaxation therapies have been commonly studied in PTSD, albeit usually as an “active control” therapy delivered individually. Most studies have found these relaxation techniques having small effect sizes (~ 0.5) when compared to individual exposure-based PTSD therapies (often with effect sizes > 1.5).^[14,15] However, as reported in a recent meta-analysis^[16] published studies of group therapies for combat PTSD, including exposure-based group therapy,^[17] have shown much smaller effect sizes (~ 0.3) than individual exposure-based therapies.

Preliminary studies among trauma-exposed persons support the notion that mindfulness-based therapies may be useful in PTSD treatment. Preliminary evidence suggests that Mind–Body group interventions with civilians with war-related trauma reduced PTSD symptoms.^[18]

A case study of acceptance and commitment therapy (ACT), which includes some mindfulness exercises, also suggested potential efficacy for combat PTSD.^[19] An adaptation of MBSR for adults with a history of childhood sexual abuse, was well accepted and led to decreased symptoms of self-reported depression and PTSD.^[20] A recent study at a VA hospital offered MBSR classes to interested veterans (about a third of whom had a history of PTSD on their computerized charts) as an adjunct to their current treatment, and also found a significant decrease in self-reported PTSD and depression symptoms.^[21] Another recent study from the same research group randomly assigned patients with charted diagnoses of PTSD to either “standard” MBSR groups (i.e. with majority patients in the group without PTSD), or no additional treatment/treatment-as-usual (TAU).^[22] MBSR was associated with improvement in self-report measures of PTSD (PCL-C), depression, quality of life, and mindfulness skills, although improvement in PCL-C was not different between the MBSR and control TAU condition. Taken together, these studies suggest that mindfulness techniques found in MBSR might be acceptable to persons with PTSD and/or trauma history, and may lead to meaningful improvements in mental health functioning. However, to our knowledge the use of mindfulness-based therapies such as MBCT, targeted to treat chronic combat-related PTSD, has not been reported.

Exposure-based therapies have been highly effective in the treatment of PTSD,^[15] and do not show higher rates of adverse events or premature dropout than other forms of PTSD therapy.^[23] Nonetheless, a significant minority of combat PTSD patients still decline this form of therapy (Liberzon et al., unpublished data). In light of this, the development of additional effective therapeutic approaches will be highly useful, and initial reports of treatment benefits of MBSR with trauma-exposed individuals^[20–22] warrant further testing of mindfulness-based interventions tailored for the treatment of PTSD. Mindfulness-based interventions may serve as an adjunctive preparation for exposure (e.g. by increasing ability to tolerate experiencing emotions), an aid to cognitive therapies (e.g. by increasing engagement and developing cognitive skills), or possibly a stand-alone intervention to modulate emotional reactivity. The present pilot study examined the acceptability and effectiveness of a brief mindfulness-based group intervention (MBCT) adapted for treatment of combat-related PTSD.

METHODS

PARTICIPANTS

Participants were consecutive patients recruited from the PTSD Outpatient Clinic of the Ann Arbor VA Health Care System based upon referral by treating clinician. Patients were recruited for a total of seven groups (four MBCT, one PTSD psychoeducation and skills group (psychoed), and two Imagery Rehearsal Therapy groups (IRT)) over a 4-year period. Assignment to groups was not randomized, but

only a single group was recruited for at a time. Inclusion criteria were long-term (>10 years) PTSD (as assessed by Clinician Administered PTSD Scale (CAPS),^[24] or PTSD in partial remission. Exclusion criteria included diagnoses of psychosis (e.g. schizophrenia, bipolar, and schizoaffective disorders) and current substance dependence, or active suicidal intent, as assessed using the Mini International Neuropsychiatric Interview (MINI).^[25] All participants endorsed combat-related traumas (DSM-IV A criteria) from military service in conflicts including World War II, Korea, Vietnam, and Operation Desert Storm (Iraq and Kuwait). We report pre and posttherapy interview data for all subjects; complete self-report measures were not available for four patients completing MBCT. Psychiatric medication regimens were unchanged over the course of the study for veterans completing the study except for one patient with comorbid MDD in the MBCT condition, who received a new prescription of citalopram during the study. No patient in any treatment group started new psychotherapy during the study. Three patients in MBCT and four patients in TAU continued ongoing group therapy in long-term process groups during the study.

PROCEDURE

Therapists and Raters. Clinical team members included five doctoral or masters level clinicians. MBCT sessions were audio taped, and a doctoral-level clinical psychologist provided weekly supervision to promote treatment integrity and fidelity; the fidelity for each of the manualized groups was also supported using therapist “checklists” used in the session. Each of the four MBCT groups had at least one clinician with formal training in MBCT and/or MBSR and previous experience with facilitating mindfulness group interventions; and at least one clinician in each group also had training in psychotherapies for treatment of PTSD. The Psychoed and IRT groups were each coled by a doctoral-level and a masters level clinical psychologist. Pre and posttreatment PTSD interview assessments (CAPS) were performed by PTSD clinic clinicians trained on CAPS not involved in the treatment delivery and not informed of the treatment status of patients.

Treatments. The MBCT treatment protocol was adapted for combat-related PTSD from MBCT for the prevention of depression relapse.^[26] The main adaptation was substitution of psychoeducation about depression with psychoeducation geared toward PTSD and stress physiology, discussion of patients PTSD symptoms in session, and encouraging patients to use a formal mindfulness exercise (the “3-Minute Breathing Space”) as well as informal mindfulness when distressing situations arose during the week. We also shortened the length of the mindfulness meditation in session and at home from 45 min to 15–20 min, and increased attention to distress from trauma memories during in-session and at-home exercises. The adapted MBCT consisted of eight, weekly 8-hr group sessions, which included skills training and in-class practice in: (1) mindfulness techniques; (2) psychoeducation regarding PTSD and stress responses; and (3) feedback and supportive group discussion of exercises. Specific in-class mindfulness exercises included: (a) “mindful eating” (the “raisin exercise”), (b) the “body-scan” exercise, (c) “mindful stretching,” (d) sitting “mindfulness” meditation exercises with various objects (breath, body, sounds, emotional states, thoughts), and (e) the “3-Minute Breathing Space” (a brief mindfulness of breath exercise). The program incorporated daily assignments of “formal” home practice of mindfulness techniques (using 15–20 min audio-recordings) as well as “informal” exercises to integrate mindfulness into everyday experiences (e.g. eating, walking, and showering), and use of the MBCT “3-Minute Breathing Space” at pre-ordained times and also when confronted with upsetting situations, including trauma memories, anxiety, and other PTSD symptoms throughout the day. Participants were instructed to practice mindfulness exercises aided by audio recordings at least 5 days a week, and the 3-Minute Breathing Exercise daily after week 4, as well as practicing mindfulness throughout the day (e.g. while walking, eating, showering,

etc.), for an additional 10–15 min a day, for a total of 25–40 min of total practice per day. Patients recorded daily practice times in homework logs that were collected weekly, in which they checked which audio recording(s) they had listened to that day, and how much time they had spent doing other mindfulness practice throughout the day.

The comparison interventions were intended as brief, plausible “treatment-as-usual” (TAU) group interventions for PTSD to control for nonspecific effects of group therapy (social support, normalization, expectancy, therapist contact), but did not exactly match contact hours or forms of homework. PTSD psychoeducation and skills (psychoed) was developed at VA Ann Arbor and consisted of eight weekly 1-hr sessions with psychoeducation about PTSD symptoms, anger, emotions, sleep, forms of coping with symptoms, PTSD psychotherapy, medications, and other services. Imagery rehearsal therapy group (IRT) was based on previous work with Vietnam veterans,^[27,28] and consisted of six weekly 1.5-hr group sessions as previously described. The rationale of imagery rehearsal was explained as using alterations to the content of a recurrent nightmare that promote mastery or control nightmare (e.g. changing a violent scene to a alternate nonviolent version) as a method to decrease distress to nightmares. Potential changes to each patients nightmares were discussed in group, and each patient selected alternate forms of their own nightmare, rewrote a script that was discussed by the group, and rehearsed this script in imagination each night prior to sleep.

Measures. Treatment responses were assessed at intake and posttreatment in all patients using a semistructured clinician-administered interview (CAPS),^[24] Patients in the MBCT condition also completed the self-report PTSD diagnostic scale (PDS)^[29] and the posttraumatic cognitions inventory (PTCI),^[30] which measures negative posttraumatic cognitions including negative (incompetent) self, negative (dangerous) world, and self blame.

Statistical Analyses. Both intention-to-treat and completer analyses were performed. Within-group effects on PTSD symptoms in the MBCT and TAU groups were examined with two-tailed paired samples *t*-tests of pre and posttherapy total CAPS scores (and intrusive, avoidant, and hyperarousal subscales), and within group effect sizes (Hedge’s *g*) were calculated. Between group effects were examined using repeated-measures analyses of variance (RM-ANOVA), and between group effect sizes calculated from the posttherapy CAPS scores. Independent sample *t*-tests and chi-squared analyses were used to examine differences between demographics, previous treatment, and symptom measures at intake.

RESULTS

At the time of recruitment, patients enrolled in the MBCT or TAU groups (Psychoed and IRT) did not differ in terms of PTSD symptom severity (CAPS), comorbidity, age, marital, or employment status, time from combat trauma, or psychiatric service-connected disability. Table 1 shows patient demographic and clinical characteristics. All of the patients had long-term PTSD (>10 years) associated with military deployment traumas, and the majority reported experience of symptoms of PTSD for >30 years. Most of the patients enrolled in this study had extensive previous psychiatric treatments, including medications and individual and group psychotherapies. There was a considerable range in patient retrospective report of psychiatric treatment history, with two patients reporting no previous treatment. Given the problems of patient retrospective report, we examined history of previous psychiatric treatment at

TABLE 1. Demographics and clinical characteristics of PTSD patients at intake

	MBCT		TAU		<i>t</i> or χ^2	<i>P</i>
Total N	20		17			
Age	60.1	9.7	58.3	8.3	0.9	.33
Years from trauma	37.3	11.3	35.7	8.7	0.5	.61
Completed therapy	15	75%	13	77%	0.0	.97
Military deployment						
Korea or WWII	3	15%	1	6%	0.8	.67
Vietnam	15	75%	14	82%		
Desert Storm (Iraq)	2	10%	2	12%		
Married	14	70%	14	82%	0.7	.38
Employed	8	40%	6	35%	0.1	.79
Service-connect psychiatric disability \geq 50%	14	70%	9	53%	1.1	.29
Comorbidity						
Current MDD	13	65%	13	76%	0.6	.44
Alcohol depend in remission	12	60%	9	62%	0.2	.76
# patients with previous weekly psychotherapy > 1 year	14	70%	10	59%	0.5	.47
Years in Psychiatric Treatment at VA Ann Arbor	4.9	5.1	3.5	3.3	0.9	.36
Current Medications						
Antidepressant	13	65%	11	65%	0.0	.99
Benzodiazepine	5	25%	4	24%	0.5	.50
Trazadone	7	35%	2	12%	2.7	.11
Antipsychotic	3	15%	4	24%	0.4	.51
Prazocin	2	10%	0	0%	1.8	.18
None	4	20%	3	18%	0.0	.93

this VA. The overall years of any form of treatment (e.g. medication, group and individual psychotherapy, inpatient and high-intensity outpatient program) were not different between the treatment groups. In terms of previous psychotherapy, the majority of patients had long-term group (and/or individual) psychotherapy, and others fewer than eight previous mental health encounters, (not different between treatment groups). Patients did not start new individual or group therapy during the study period. Three patients in MBCT and four patients in the IRT group were also in concurrent group therapies (remained in their long-term process groups). The majority of patients were taking psychiatric medications for PTSD, depression, and/or pain, there were no differences in medications between treatment groups.

COMPLIANCE AND RETENTION

We report behavioral evidence of acceptability as reflected in session attendance and homework completion. Treatment “completion” was defined as attending at least five sessions of MBCT or Psychoed, and at least four sessions of IRT. Five (25%) patients enrolled in MBCT groups and four (29%) patients enrolled in TAU groups discontinued treatment within the first three sessions. MBCT noncompleters endorsed several reasons for their decision not to continue with treatment: two cited low expectations/interest, three cited

scheduling/transportation difficulties, and two endorsed increased anxiety during mindfulness exercises involving attending to bodily states; one, a survivor of sexual trauma, reported that the “body scan” exercise triggered traumatic memories of his assault. Reasons for drop out in the TAU groups were not specified.

Of the seven homework sheets, MBCT treatment completers turned in an average of 4.6 (SD = 1.4) sheets, in which they reported listening to at least one 15–20 min audio recording on average 5.5 (SD = 1.3) days per/week, amounting to an average self-report of 102.3 (SD = 20.4) min/week of audio-guided mindfulness practice. There was wide variation of self-report of mindfulness throughout the day (i.e. while eating, walking, showering, etc.), which was further skewed by three older retired veterans who each reported >60 min of informal practice per day, 7 days a week in which they included time spent doing daily physical therapy exercises or other routines “mindfully.” Exclusion of these three participants found self-report of an average of 12.2 (SD = 6.6) additional minutes of “informal” mindfulness practice on days practice is reported.

TREATMENT RESPONSE

Intent-to-treat analyses found that patients who were enrolled in MBCT showed a significant reduction in total CAPS score (pre versus post MBCT $t(19) = 4.8$, $P < 0.001$, average 11-point decrease in total CAPS, effect size Hedges $g = 0.54$). In contrast, patients enrolled in the TAU did not show a significant reduction in CAPS ($t(16) = 0.2$, $P = .83$, $g = -0.04$). In between condition analyses, RM-ANOVA found a significant Condition \times Time interaction ($F[1,34] = 11.4$, $P = 0.002$) in total CAPS scores, with between condition posttherapy CAPS scores Hedges $g = 0.67$.

Differences in demographics, symptoms severity, and treatment history were not detected at intake between treatment completers ($N = 32$) and noncompleters ($N = 9$). Patients who completed MBCT ($N = 15$) showed significant improvement in PTSD symptoms (Table 2 and Figure 1), with effect size $g = 0.67$ for pre-post CAPS total score. The improvement in the MBCT condition appeared to be explained by a significant reduction in the CAPS-avoidant subscale. A single patient in the MBCT condition received a new prescription of citalopram during the group. This patient had among the highest intake CAPS, and also showed the least improvement at posttherapy assessment. Exclusion of this subject from the MBCT completer analysis did not affect reduction in total CAPS score findings ($t(13) = 5.6$, $P < 0.001$); nor did exclusion of the three older veterans with reports of very high home practice ($t(11) = 5.7$, $P < 0.001$). In contrast, patients who completed the TAU interventions (Psychoed and IRT) did not show reduction in total CAPS ($t(12) = 0.5$, $P = 0.622$) or any CAPS subscale (Table 2, Figure 1). Between treatment condition comparisons in completers also found a significant condition \times time interaction in total CAPS scores and

TABLE 2. PTSD symptoms (CAPS) prepost and condition effects

Outcome		Intention-to-treat analysis (MBCT N = 20, TAU N = 17)								Prepost g	Btw group g	Group* × Time																																																																					
		Pre-therapy		Post therapy		Delta	t	df	P			F[1,33]	P																																																																				
		Mean	SD	Mean	SD																																																																												
CAPS Total	MBCT	74.5	19.3	62.6	23.1	-11.8	4.8	19	<0.001	0.55	0.77	14.7	0.001																																																																				
	TAU	76.8	15.1	78.4	15.5	1.6	0.7	16	0.518	-0.10				Intrusive	MBCT	20.5	7.2	18.8	9.2	-1.7	1.4	19	0.183	0.20	0.77	1.2	0.290	TAU	24.5	5.5	24.9	5.7	0.4	0.3	16	0.786	-0.07	Avoidance	MBCT	29.2	10.3	20.9	11.2	-8.3	4.6	19	<0.001	0.76	0.67	11.9	0.001	TAU	27.0	8.6	27.8	9.6	0.8	0.4	16	0.673	-0.09	Hyperarousal	MBCT	24.7	6.9	22.9	7.9	-1.7	1.7	19	0.100	0.24	0.37	0.6	0.461	TAU	26.3	5.1	25.6	5.9	-0.6
Intrusive	MBCT	20.5	7.2	18.8	9.2	-1.7	1.4	19	0.183	0.20	0.77	1.2	0.290																																																																				
	TAU	24.5	5.5	24.9	5.7	0.4	0.3	16	0.786	-0.07				Avoidance	MBCT	29.2	10.3	20.9	11.2	-8.3	4.6	19	<0.001	0.76	0.67	11.9	0.001	TAU	27.0	8.6	27.8	9.6	0.8	0.4	16	0.673	-0.09	Hyperarousal	MBCT	24.7	6.9	22.9	7.9	-1.7	1.7	19	0.100	0.24	0.37	0.6	0.461	TAU	26.3	5.1	25.6	5.9	-0.6	0.6	16	0.554	0.12																				
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	TAU	26.3	5.1	25.6	5.9	-0.6	0.6	16	0.554	0.12																																																																							

Outcome		Completer analysis (MBCT N = 15, TAU N = 13)								Prepost g	Btw group g	Group × Time																																																																					
		Pre therapy		Post therapy		Delta	t	df	P			F[1,26]	P																																																																				
		Mean	SD	Mean	SD																																																																												
CAPS total	MBCT	73.5	21.7	57.7	24.3	-15.7	6.2	14	<0.001	0.67	1.01	16.2	0.001																																																																				
	TAU	77.2	16.3	79.4	16.7	0.8	-0.2	12	0.838	-0.05				Intrusive	MBCT	19.3	6.9	17.1	9.4	-2.2	1.3	14	0.621	0.26	0.86	1.2	0.290	TAU	24.4	9.1	24.9	6.4	0.5	-0.3	12	0.780	-0.06	Avoidance	MBCT	30.5	10.1	19.5	11.1	-11.0	5.6	14	<0.001	1.01	0.76	14.7	0.001	TAU	27.1	9.9	28.2	11.1	1.1	-0.4	12	0.680	-0.10	Hyperarousal	MBCT	23.7	7.8	21.3	8.5	-2.5	1.9	14	0.151	0.29	0.67	0.7	0.407	TAU	27.2	4.0	26.3	5.3	-0.8
Intrusive	MBCT	19.3	6.9	17.1	9.4	-2.2	1.3	14	0.621	0.26	0.86	1.2	0.290																																																																				
	TAU	24.4	9.1	24.9	6.4	0.5	-0.3	12	0.780	-0.06				Avoidance	MBCT	30.5	10.1	19.5	11.1	-11.0	5.6	14	<0.001	1.01	0.76	14.7	0.001	TAU	27.1	9.9	28.2	11.1	1.1	-0.4	12	0.680	-0.10	Hyperarousal	MBCT	23.7	7.8	21.3	8.5	-2.5	1.9	14	0.151	0.29	0.67	0.7	0.407	TAU	27.2	4.0	26.3	5.3	-0.8	0.6	12	0.560	0.19																				
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CAPS, clinician administered PTSD scale; MBCT, mindfulness-based cognitive therapy; TAU, treatment as usual; SD, standard deviation; g, Hedge's *g* (bias corrected effect size).

the CAPS-avoidant subscale. The number of treatment completers with "clinically meaningful" improvements in PTSD symptoms (reduction of 10 points on the total CAPS scale) was significantly greater in the MBCT completers (11 of 15, 73%) compared to TAU completers (4 of 13, 33%), chi squared = 4.2, Fisher's exact $P < 0.05$. Decrease in PTSD intrusive symptoms (CAPS intrusive subscale) in MBCT completers was correlated with reported average time per week spent on mindfulness practice using audiorecordings ($r(15) = 0.53, P = 0.03$).

Additional self-report measures were available for MBCT completers only (Table 3). Similar to CAPS, self-report of PTSD symptoms (PDS) were significantly reduced following MBCT, and appeared to be due to decrease in PDS "numbing" subscale. Negative cognitions

(PTCI) also improved significantly following MBCT, with significant reductions in total PTCI score and self-blame cognitions, as well as marginally significant decreases in negative self and world cognitions.

DISCUSSION

The results of this pilot trial of a brief mindfulness-based group therapy suggest that an MBCT group therapy targeted for combat-related PTSD is acceptable and a potentially effective novel therapeutic approach for PTSD symptoms and trauma-related negative cognitions. The majority of veterans enrolled in the mindfulness group showed good engagement in the "in session" exercises, and were also compliant with daily

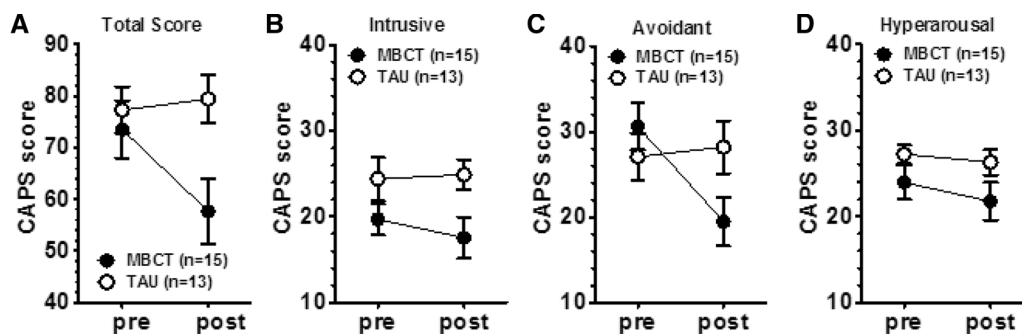


Figure 1. PTSD symptom severity before and after the 8-week mindfulness training group. Shown are plots of changes in PTSD symptoms (Clinician-Administered PTSD Scale) total and intrusive, avoidant, and hyperarousal subscales.

TABLE 3. Self-report measures (MBCT group only)

Outcome	Pre therapy		Post therapy		Delta	<i>t</i>	<i>df</i>	<i>P</i>	Prepost <i>g</i>
	Mean	SD	Mean	SD					
PDS									
PDS total	34.8	9.6	29.7	12.6	-5.1	2.3	12	0.014	0.59
Re-experiencing	9.1	4.1	7.8	3.7	-1.3	2.6	12	0.119	0.30
Numbing	13.6	4.5	11.0	5.3	-2.6	1.0	12	0.029	0.69
Hyperarousal	12.1	3.1	10.8	5.2	-1.2	2.6	12	0.267	0.25
PTCI									
Negative self	4.0	1.3	3.4	1.5	-0.6	1.94	10	0.081	0.48
Negative world	5.3	1.0	4.4	1.9	-0.9	2.07	10	0.065	0.61
Self blame	3.6	1.3	2.3	1.3	-1.3	2.86	10	0.017	1.04

MBCT, mindfulness-based cognitive therapy; PDS, PTSD diagnostic scale; PTCI, posttraumatic cognitions inventory; SD, standard deviation; *g*, Hedge's *g* (bias corrected effect size).

mindfulness practice; several reported an unexpectedly high level of engagement and compliance with home mindfulness practice. There was a 25% dropout rate of veterans discontinuing MBCT (all within the first three weeks), a dropout rate that was not different from the TAU groups and similar with typical dropout rates in outpatient treatment studies of PTSD.^[27] However, it is important to note that two patients who dropped reported increased anxiety during the mindfulness exercises as a factor contributing to dropping the group. This suggests that great attention should be paid to “body-focused” exercises such as the body scan, which may be especially challenging for veterans with a history of sexual assault. Delivering such interventions in modified form and/or only after establishment of appropriate rapport and safety, might be useful for these patients.

The MBCT group showed significant reduction in PTSD symptoms pre- versus post MBCT as assessed by clinician-administered interview (CAPS) in both intent-to-treat and completer analyses. MBCT also showed significantly greater reduction in CAPS than a comparison “TAU” group therapy condition. While the improvement in PTSD symptoms in the brief 8-week MBCT intervention was moderate (averaging ~16 points on the total CAPS, effect size Hedge's *g* ~0.7), this level of CAPS reduction has been interpreted as representing a clinically meaningful improvement in PTSD (e.g. 10 points or more),^[33] and 73% of patients in MBCT (compared to 33% in TAU groups) showed clinically meaningful improvement. While the effects of MBCT on PTSD symptoms were smaller than treatment effects reported with individual, 12–15 week, prolonged exposure therapy,^[31,32] group PTSD treatments have shown smaller effects sizes; and the present data compare favorably to effects reported in other group therapies for combat PTSD, including a 30-week trauma-focused exposure based group therapy.^[17] The outcomes seen in MBCT (adapted for PTSD) on both self-reported and clinician-rated PTSD symptoms found in this study were similar to effects of MBSR on self-reported PTSD symptoms in recent studies.^[20–22]

These findings are particularly noteworthy in light of the short duration of MBCT-based intervention in this trial on one hand, and the chronicity of PTSD symptoms reported by our veterans (15–50 years) on the other. Interestingly, the mindfulness group appeared to reduce mainly the avoidant cluster symptoms, on CAPS, suggesting potential specificity of action here, which is consistent with the emphasis on reduced avoidance of unwanted emotions, and experiences in mindfulness training.^[6,8,11] Given that one might expect avoidance symptoms to change first, a longer intervention or follow-up assessments may show greater impact on intrusive and hyperarousal symptoms, although such speculation requires further study. Additionally, consonant with an emphasis on mindful attention to positive experiences and nonjudgmental acceptance, the intervention led to a significant decrease in cognitions of self-blame and a trend toward decreased perception of the world as a dangerous place.

Several limitations of this pilot study should be noted. Our patients were recruited based upon availability and included veterans of a range of ages, conflicts, and deployments (e.g. WWII, Korea, Vietnam, Desert Storm), but were primarily older veterans with long-term PTSD. While we are reporting results of a “treatment as usual” group intervention for comparison, with a well-matched long-term combat PTSD patient sample, it is important to note that patients were not randomly assigned to different treatments. Thus, the reported results must be considered as preliminary, and these findings have to be replicated in random assignment design (currently underway). Nevertheless, groups were recruited one at a time with consecutive patients, and patients were not selected based upon clinical characteristics or preferences. Furthermore, although the TAU groups were both brief weekly group interventions for PTSD, they had lower contact time than MBCT and did not match amount of daily homework. It should be noted that the lack of significant decrease in PTSD symptoms in the IRT intervention was inconsistent with our initial expectations, but is consistent with subsequent findings of only small improvements in PTSD symptoms in group

IRT in Vietnam veterans with PTSD.^[28] The study included a relatively small sample and several patients did not complete posttreatment measures. MBCT and IRT treatment fidelity was assessed by therapist checklist, but not by independent assessment of recorded sessions.

Nonetheless, despite the small sample, patients who completed the MBCT group showed meaningful improvements in both PTSD symptoms and cognitions. Future studies with larger samples and random assignment will be needed to determine whether mindfulness-based interventions also significantly reduce PTSD symptoms beyond the avoidance cluster. Additionally, the lack of follow-up assessment in this study limits ability to determine additional symptom changes subsequent to treatment. Given the long-term protection from depression relapse afforded by MBCT,^[2-4] future studies of this type of intervention should assess PTSD outcomes at later follow-ups.

The purpose of the present pilot study was to provide initial data on the feasibility and acceptability, as well as estimates of effect sizes, of a mindfulness-based group intervention (MBCT) targeted for treatment of combat PTSD. The brief 8-week group-based intervention appeared acceptable to veterans in a VA PTSD clinic, who demonstrated high levels of engagement, and was associated with a statistically significant and clinically meaningful improvement in PTSD symptoms. Thus, despite limitations, the preliminary results of this pilot study are encouraging and support further investigation of mindfulness-based interventions for combat-related PTSD, particularly with larger samples and treatment randomization. Mindfulness-based therapies provide a strategy that encourages active engagement without explicit cognitive restructuring or exposure to trauma memories, are relatively easy to learn, and can be administered in an efficient group format. Increased ability to actively attend to, and generate nonjudgmental acceptance of, traumatic memories and physiological responses may help prepare individuals for trauma-focused therapies, such as prolonged exposure. Further research is needed to determine whether mindfulness training is more aptly considered an adjunct to the gold-standard treatment of prolonged exposure, or whether PTSD interventions including mindfulness can function as interventions for treating avoidant and other symptoms of combat PTSD in their own right.

Acknowledgment. This research was supported by Department of Defense TATRC, grant W81XWH0820208 to IL and AK, and Mind and Life Institute Varela Award to AK.

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