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Long-term outcomes of mindfulness-based cognitive therapy for combat-related PTSD

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Abstract

Combat-related Post-Traumatic Stress Disorder (PTSD) continues to pose a significant challenge to the mental health of military veterans, with long-term psychological and functional impairments. This study examined the effectiveness of Mindfulness-Based Cognitive Therapy (MBCT) in promoting sustained recovery among individuals with combat-related PTSD. A total of 60 participants were enrolled and followed for six months post-intervention. PTSD symptom severity was measured using the Clinician-Administered PTSD Scale (CAPS-5), alongside assessments of mindfulness and emotional regulation. The results indicated a statistically significant reduction in PTSD symptoms immediately post-treatment, with these improvements largely maintained at the six-month follow-up. Participants also demonstrated marked increases in mindfulness and emotional regulation capacities. The findings suggest that MBCT not only contributes to immediate symptom relief but also supports long-term psychological resilience and relapse prevention in veterans. These outcomes underscore the potential of MBCT as a sustainable, non-pharmacological intervention for combat-related PTSD.

Keywords: Mindfulness-based cognitive therapy, combat-related PTSD, long-term outcomes, veterans

Introduction

Post-Traumatic Stress Disorder (PTSD) is a debilitating mental health condition that can arise after exposure to traumatic events, particularly among military personnel exposed to combat situations. Symptoms such as intrusive memories, hyperarousal, avoidance, and negative alterations in mood and cognition can severely impair daily functioning and quality of life (American Psychiatric Association, 2013) [1]. Combat-related PTSD presents unique challenges due to the intensity, frequency, and moral complexity of trauma exposure in war zones. Veterans with combat experience are often at increased risk of chronic PTSD, with long-term consequences including substance use disorders, relationship difficulties, and heightened suicide risk (Seal *et al*., 2009; Hoge *et al*., 2004) [13, 8].

Traditional approaches to treating PTSD, such as cognitive-behavioral therapy (CBT) and pharmacotherapy, have demonstrated effectiveness; however, a substantial number of individuals either do not respond adequately or discontinue treatment prematurely (Steenkamp *et al*., 2015) [15]. Furthermore, long-term relapse rates remain high, emphasizing the need for interventions that not only reduce symptoms but also cultivate sustainable psychological resilience (Foa *et al*., 2009) [4]. In recent years, Mindfulness-Based Cognitive Therapy (MBCT) has emerged as a promising intervention for PTSD due to its dual focus on present-moment awareness and cognitive restructuring. Originally developed to prevent relapse in depression (Segal, Williams, & Teasdale, 2002) [14], MBCT integrates principles of mindfulness meditation with elements of cognitive therapy, encouraging individuals to relate differently to distressing thoughts and emotions.

Several studies have demonstrated the short-term efficacy of MBCT in reducing PTSD symptoms, particularly in populations exposed to chronic stress or trauma (King *et al*., 2013; Banks *et al*., 2015) [11, 2]. MBCT facilitates emotional regulation, reduces rumination, and increases acceptance, making it particularly suitable for veterans who may experience guilt, shame, and moral injury associated with combat (Polusny *et al*., 2015) [12]. Despite these promising findings, the long-term impact of MBCT on combat-related PTSD remains underexplored, especially beyond the initial post-treatment phase. Most studies focus on symptom improvement immediately after the intervention, leaving a gap in our understanding of whether these benefits are sustained over time.

This study seeks to address this gap by evaluating the long-term outcomes of MBCT in a sample of military veterans diagnosed with combat-related PTSD. By assessing PTSD symptoms, mindfulness levels, and emotional regulation at multiple time points, including a six-month follow-up, the study aims to determine whether MBCT offers enduring therapeutic benefits. The findings of this research could have significant implications for the design of trauma recovery programs, especially in military and veteran healthcare settings, where long-term functional recovery and relapse prevention are paramount.

Review of Literature

Post-Traumatic Stress Disorder (PTSD) has been widely studied due to its profound psychological and social consequences, especially among veterans exposed to combat. Over the decades, treatment approaches have evolved from primarily pharmacological and exposure-based therapies to more integrative psychosocial interventions, such as mindfulness-based approaches (Foa *et al*., 2009; Steenkamp *et al*., 2015) [4, 15]. Combat-related PTSD, in particular, is characterized by complex symptoms involving emotional dysregulation, intrusive memories, and moral injury-factors that demand therapeutic interventions beyond symptom suppression.

Traditional Approaches and Their Limitations

Conventional treatments like cognitive behavioral therapy (CBT), prolonged exposure (PE), and selective serotonin reuptake inhibitors (SSRIs) have shown efficacy in reducing PTSD symptoms. However, many veterans struggle with treatment engagement and adherence, with dropout rates ranging from 20% to 50% in exposure-based therapies (Hoge *et al*., 2004; Steenkamp *et al*., 2015) [8, 15]. Pharmacological interventions often provide symptom relief but may not address underlying cognitive and emotional processes, and relapse rates remain significant when medications are discontinued (Hoskins *et al*., 2015) [9].

Emergence of Mindfulness-Based Cognitive Therapy (MBCT): Mindfulness-Based Cognitive Therapy (MBCT), originally developed for relapse prevention in depression, integrates mindfulness practices with cognitive therapy techniques (Segal, Williams, & Teasdale, 2002) [14]. The growing body of evidence supporting MBCT in trauma populations rests on its ability to help individuals decenter from traumatic thoughts, improve emotional regulation, and reduce avoidance-a central mechanism in PTSD maintenance (Kearney *et al*., 2013; Banks *et al*., 2015) [10, 2].

MBCT in PTSD: Empirical Evidence

Several clinical trials have supported the use of MBCT in treating PTSD. King *et al*. (2013) [11] conducted a pilot study on combat veterans and found significant reductions in PTSD symptoms following group MBCT. Participants also showed improvements in mindfulness and acceptance, which are known to mediate therapeutic outcomes in PTSD. Similarly, Polusny *et al*. (2015) [12] conducted a large randomized controlled trial (RCT) comparing Mindfulness-Based Stress Reduction (MBSR) to Present-Centered Therapy (PCT) among veterans. Results indicated that MBSR was associated with greater reductions in PTSD symptoms and functional impairment, even at a 6-month follow-up.

A meta-analysis by Gallegos *et al*. (2017) [7] further confirmed that mindfulness interventions led to moderate-to-large effects on PTSD symptoms, particularly among military and first responder populations. The study emphasized that mindfulness practices may increase tolerance to distressing internal experiences and reduce experiential avoidance-a core feature of PTSD.

Long-term effects and gaps in literature

Although short-term benefits of MBCT are well-documented, relatively fewer studies have explored the long-term maintenance of therapeutic gains, especially in combat-related PTSD. A study by Wahbeh *et al*. (2014) [5] examined veterans with PTSD who participated in a mindfulness program and reported continued symptom reduction at the 4-month follow-up. However, the study lacked a control group, limiting the strength of causal inferences. More recent work by Boyd *et al*. (2018) [3] also suggests that mindfulness practices may lead to sustained improvements in PTSD, anxiety, and depression over time, but highlighted the need for more rigorous longitudinal studies with standardized outcome measures.

Furthermore, there is a paucity of research comparing MBCT outcomes across different intervention formats (e.g., MBCT alone vs. MBCT plus pharmacotherapy) and among diverse veteran populations. Long-term follow-up data is essential to assess relapse rates, adherence, and sustained psychological functioning-dimensions that are especially relevant in military health systems, where PTSD often becomes chronic and comorbid with other disorders (Seal *et al*., 2009; Forbes *et al*., 2010) [13, 6].

The literature supports the short-term effectiveness of MBCT for PTSD, including in combat-exposed populations. However, there remains a significant gap in understanding its long-term efficacy, particularly for combat-related PTSD. This highlights the need for longitudinal studies that examine sustained symptom remission, treatment adherence, and psychological resilience over time. The current study aims to fill this gap by assessing the long-term outcomes of MBCT in a veteran population with combat-related PTSD.

Research Methodology

This study employed a longitudinal, quasi-experimental design to assess the long-term outcomes of Mindfulness-Based Cognitive Therapy (MBCT) in individuals diagnosed with combat-related Post-Traumatic Stress Disorder (PTSD). The target population consisted of military veterans who had been formally diagnosed with PTSD by a licensed clinical psychologist according to DSM-5 criteria. A total of 60 participants were purposively selected from a veteran mental health clinic affiliated with a tertiary care hospital. All participants provided informed consent, and ethical clearance was obtained from the Institutional Review Board prior to the commencement of the study.

Participants were randomly assigned into two groups: the experimental group, which received MBCT, and a control group, which was placed on a waitlist and received standard care including medication and periodic counseling. The MBCT intervention followed the standardized 8-week program as outlined by Segal, Williams, and Teasdale

(2002) [14], incorporating weekly 2-hour group sessions led by a certified MBCT instructor. The sessions included guided mindfulness practices, cognitive restructuring exercises, and psychoeducation on trauma and emotional regulation. Participants were also encouraged to engage in daily home practice using audio-guided meditations and reflection journals.

Data collection was carried out at three time points: pre-intervention (T_1), immediately post-intervention (T_2), and at a 6-month follow-up (T_3). PTSD symptom severity was assessed using the Clinician-Administered PTSD Scale for DSM-5 (CAPS-5), while mindfulness levels were measured using the Five Facet Mindfulness Questionnaire (FFMQ). Emotional regulation was evaluated using the Difficulties in Emotion Regulation Scale (DERS). These psychometric instruments were chosen due to their high reliability and validity in PTSD and mindfulness-related research.

Quantitative data were analyzed using SPSS software. Repeated measures ANOVA was conducted to examine changes in PTSD symptoms, mindfulness, and emotion regulation over time within and between groups. Effect sizes were calculated using partial eta squared (η^2), and post-hoc Bonferroni corrections were applied where appropriate. Attrition was accounted for by using intention-to-treat analysis to ensure robustness of results. Qualitative feedback from participant reflection journals was also thematically analyzed to complement the quantitative findings and provide insights into participant experiences.

Overall, the research methodology ensured methodological rigor and ethical compliance while aiming to capture the nuanced, long-term impact of MBCT on combat-related PTSD symptoms and psychological functioning.

Objectives of the Study

1. To evaluate the effectiveness of Mindfulness-Based Cognitive Therapy (MBCT) in reducing PTSD symptom severity among combat veterans.
2. To assess the impact of MBCT on enhancing mindfulness and emotional regulation abilities in individuals with combat-related PTSD.
3. To examine the long-term sustainability of therapeutic outcomes (PTSD symptoms, mindfulness, and emotional regulation) at a six-month follow-up post-intervention.

Hypotheses of the Study

1. **H_1:** Participants who undergo Mindfulness-Based Cognitive Therapy (MBCT) will show a significant reduction in PTSD symptom severity compared to those in the control group receiving standard care.
2. **H_2:** Participants receiving MBCT will demonstrate significantly higher levels of mindfulness and emotional regulation post-intervention compared to their baseline scores and the control group.
3. **H_3:** The therapeutic gains from MBCT-specifically reduced PTSD symptoms and improved mindfulness and emotional regulation-will be maintained or further improved at the 6-month follow-up compared to immediately post-intervention.

Analysis and Interpretation

To evaluate the hypothesis, the Clinician-Administered PTSD Scale for DSM-5 (CAPS-5) scores were compared between the experimental group (MBCT) and the control group (standard care) at two time points: pre-intervention and post-intervention. The sample consisted of 60 participants, with 30 in each group.

A paired sample t-test was conducted within each group to assess the change in PTSD symptom severity from pre-test to post-test. Additionally, an independent samples t-test was used to compare the post-intervention scores between the two groups to determine the efficacy of MBCT.

Table 1: Comparison of Pre- and Post-Intervention CAPS-5 scores

Group	Time Point	Mean Score	Standard Deviation (SD)	t-value	p-value
MBCT Group	Pre-Test	39.20	5.80		
	Post-Test	22.50	6.10	10.12	<0.001
Control Group	Pre-Test	38.70	6.00		
	Post-Test	34.90	6.40	3.12	0.004
Between Groups	Post-Test Only	MBCT: 22.50 Control: 34.90	-	7.24	<0.001

The results indicate a statistically significant reduction in PTSD symptom severity within both groups. However, the MBCT group showed a substantially greater reduction in symptoms from pre- to post-intervention (mean difference = 16.70, $p<0.001$) compared to the control group (mean difference = 3.80, $p = 0.004$).

Furthermore, the between-group comparison at the post-intervention stage revealed a significant difference in CAPS-5 scores ($t = 7.24$, $p<0.001$), favouring the MBCT group. These findings suggest that MBCT was more effective than standard care in reducing PTSD symptoms among combat veterans.

Thus, Hypothesis H_1 is supported, confirming that MBCT significantly reduces PTSD symptom severity compared to standard treatment.

H_2: Participants receiving MBCT will demonstrate significantly higher levels of mindfulness and emotional regulation post-intervention compared to their baseline scores and the control group.

To test this hypothesis, changes in mindfulness and emotional regulation were assessed using the Five Facet Mindfulness Questionnaire (FFMQ) and the Difficulties in Emotion Regulation Scale (DERS) respectively. Data were collected at pre-intervention and post-intervention stages for both the MBCT group and the control group.

Paired sample t-tests were used to analyze within-group changes (pre-vs. post-intervention), while independent samples t-tests were used to compare the MBCT and control groups' post-intervention scores.

Table 2: Mindfulness Scores (FFMQ)

Group	Time Point	Mean Score	SD	t-value	p-value
MBCT	Pre-Test	112.40	9.85		
	Post-Test	139.20	8.90	11.76	<0.001
Control	Pre-Test	113.70	10.15		
	Post-Test	117.60	9.65	2.01	0.053
Post-Test Comparison	MBCT: 139.20 Control: 117.60	-	-	8.12	<0.001

Table 3: Emotional Regulation Scores (DERS)

Group	Time Point	Mean Score	SD	t-value	p-value
MBCT	Pre-Test	108.50	11.40		
	Post-Test	87.30	10.25	9.32	<0.001
Control	Pre-Test	107.80	10.90		
	Post-Test	102.20	11.10	2.18	0.037
Post-Test Comparison	MBCT: 87.30 Control: 102.20	-	-	5.86	<0.001

(**Note:** Lower DERS scores indicate better emotional regulation)

The MBCT group showed significant improvements in both mindfulness and emotional regulation post-intervention. Their FFMQ scores increased significantly ($t = 11.76$, $p<0.001$), indicating a higher level of mindfulness, and their DERS scores decreased substantially ($t = 9.32$, $p<0.001$), reflecting better emotional regulation.

While the control group also showed marginal improvements, the changes were significantly smaller. Importantly, between-group comparisons of post-intervention scores for both FFMQ and DERS revealed highly significant differences in favor of the MBCT group ($p<0.001$).

These results strongly support Hypothesis H_2, confirming that MBCT leads to greater improvements in mindfulness and emotional regulation compared to standard care.

H_3: The therapeutic gains from MBCT-specifically reduced PTSD symptoms and improved mindfulness and emotional regulation-will be maintained or further improved at the 6-month follow-up compared to immediately post-intervention.

To assess the long-term effectiveness of Mindfulness-Based Cognitive Therapy (MBCT), a follow-up evaluation was conducted six months after the conclusion of the intervention. The study examined whether the improvements observed immediately after the 8-week MBCT program-in terms of PTSD symptoms, mindfulness, and emotional regulation-were sustained or further enhanced over time.

Three outcome measures were analysed

- PTSD symptom severity using the CAPS-5,
- Mindfulness using the FFMQ, and
- Emotional regulation using the DERS.

A repeated measures ANOVA was conducted for each variable across three time points: Pre-Test (T_1), Post-Test (T_2), and Follow-Up (T_3). Post-hoc analyses with Bonferroni corrections were applied to assess specific differences between time points.

Table 4: Mean Scores Across Time Points (MBCT Group)

Variable	T1 (Pre-Test)	T2 (Post-Test)	T3 (6-Month Follow-Up)	F-value	p-value
CAPS-5 (↓ = Improvement)	39.20	22.50	20.10	89.76	<0.001
FFMQ (↑ = Improvement)	112.40	139.20	142.60	94.28	<0.001
DERS (↓ = Improvement)	108.50	87.30	84.20	76.45	<0.001

Post-Hoc Comparisons (MBCT Group)

- **CAPS-5:** T_1 vs T_2 ($p<0.001$); T_2 vs T_3 ($p = 0.043$)
- **FFMQ:** T_1 vs T_2 ($p<0.001$); T_2 vs T_3 ($p = 0.032$)
- **DERS:** T_1 vs T_2 ($p<0.001$); T_2 vs T_3 ($p = 0.048$)

The findings from the repeated measures ANOVA and post-hoc tests show that participants in the MBCT group sustained or further improved their psychological health at the 6-month follow-up. PTSD symptoms (CAPS-5) continued to decline slightly, mindfulness levels (FFMQ) increased modestly, and difficulties in emotional regulation (DERS) decreased further, all showing statistically significant changes between post-test and follow-up ($p<0.05$).

These results strongly support Hypothesis H_3, indicating that the therapeutic gains from MBCT were not only maintained over time but, in some cases, continued to improve. This suggests that MBCT has a durable, long-term impact on symptom reduction and psychological resilience in individuals with combat-related PTSD.

Conclusion

The present study provides compelling evidence for the long-term efficacy of Mindfulness-Based Cognitive Therapy (MBCT) in managing combat-related Post-Traumatic Stress Disorder (PTSD). Participants who underwent MBCT showed significant reductions in PTSD symptom severity, along with marked improvements in mindfulness and emotional regulation, when compared to those receiving standard care. Importantly, these therapeutic gains were not only sustained but further enhanced at the six-month follow-up, suggesting the enduring impact of mindfulness-based interventions on psychological well-being. The findings underscore MBCT as a viable, non-pharmacological treatment approach that fosters self-awareness, emotional resilience, and cognitive flexibility in individuals grappling with trauma. Given the growing need for holistic and sustainable interventions for veterans and trauma survivors, MBCT emerges as a promising addition to existing therapeutic modalities. Future research should focus on larger, more diverse samples and explore the integration of MBCT into routine clinical care for PTSD to enhance treatment accessibility and effectiveness.

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