

Impact of Online Mindfulness Based Cognitive Therapy on Suicidal Ideation

By

Julia Brianne Kaufman

Department of Psychology and Neuroscience

University of Colorado Boulder

Boulder, Colorado 80309

April 6th 2020

Thesis Advisor: Dr. Sona Dimidjian, Department of Psychology and Neuroscience

Defense Committee:

Dr. Sona Dimidjian, Department of Psychology and Neuroscience, Thesis Advisor

Dr. Gregory Carey, Department of Psychology and Neuroscience, Honors Council
Representative

Dr. Christopher Lowry, Department of Integrative Physiology, Committee Member

Abstract

Based on the prevalence of depression, suicide, and suicidal ideation, it is imperative to increase access to effective interventions. Mindfulness Based Cognitive Therapy (MBCT; Segal, Williams, & Teasdale, 2000) is a promising intervention in this regard given its evidence base and capacity to be delivered digitally through the Mindful Mood Balance program (MMB). This study investigates the impact of the MMB program paired with a standard depression care pathway (DepCare) compared to DepCare alone on suicidal ideation in a randomized clinical trial among depressed patients with residual depressive symptoms ($N=460$) (Segal et al., 2020). This study also examines both suicidal ideation and depression outcomes among a subset of participants who are at elevated risk based on a history of attempted suicide or current suicidal ideation at baseline ($N=109$). In the full sample, the MMB program was associated with a reduced proportion of participants reporting suicidal ideation relative to DepCare. Among participants with elevated risk, there were no statistically significant effects between groups in the proportion of participants reporting suicidal ideation; however, there was evidence that MMB offers significant benefit with respect to depression severity outcomes among the elevated risk group. These findings suggest MMB is a promising and accessible evidence-based intervention for suicidal ideation and depression among patients with residual depression symptoms and, specifically, among those at elevated risk for suicidal ideation.

Keywords: Suicide, Suicidal Ideation, Depression, Mindfulness, MBCT, Digital Interventions

Introduction

Suicide was the 10th leading cause of death overall and the second leading cause of death for ages 10-34 in the US in 2017 (Heron, 2019). In 2018, 10.7 million individuals over the age of 18 reported contemplating suicide at any time over the course of the year (Substance Abuse and Mental Health Services Administration, 2019). The same survey found 7.2% of adults over the age of 18 had at least one major depressive episode (MDE) during the past year (Substance Abuse and Mental Health Services Administration, 2019). Additionally, in 2018, 32.0% of adults over 18 who experienced a MDE also had serious thoughts of suicide (Substance Abuse and Mental Health Services). This consistency of suicidal ideation across episodes of depression highlights the importance of interventions that target recurrent depression as a strategy to address suicide risk (Williams et al., 2006). The clear link between suicidal ideation, suicide attempts and depression coupled with the need for effective and accessible intervention forms the context for the present study. There is strong evidence for the use of Mindfulness Based Cognitive Therapy (MBCT) as an intervention for recurrent depression and residual depression symptoms and as a protective factor against suicidal ideation (Barnhofer et al., 2015; Chesin et al., 2015; Forkmann et al., 2014; Geschwind et al., 2012; Kenny & Williams, 2007; Teasdale et al., 2000). However, few studies address the need for more accessible, web-based formats to provide this information to individuals at risk for suicidal ideation.

Prevalence of Suicidal Ideation Among Patients with a History of Depression

Suicidal ideation with or without a plan or a suicide attempt is one of the criteria for major depressive disorder (MDD) in the Diagnostic and Statistical Manual of Mental Disorders, Fifth Edition (5th ed.; DSM-5; American Psychiatric Association, 2013). Individuals who have recently attempted suicide and have a mood disorder such as MDD are at the highest risk for

death by suicide especially within the first year after the attempt (Nordström et al., 1995). There is also a heightened risk of suicidal behavior in individuals living with recurrent depression (Oquendo, Currier, & Mann, 2006). Moreover, the majority of patients with MDD who died by suicide did not receive treatment for depression (Isometsä et al., 1994).

The Centers for Disease Control and Prevention (CDC) defines suicide as self-injurious behavior paired with intention to die resulting in death (Crosby, Ortega, & Melanson, 2011). Suicidal ideation refers to thoughts regarding suicide-related behaviors such as planning or considering suicide (Crosby, Ortega, & Melanson, 2011). It is important to define the term suicidal ideation because in many studies investigating suicide, it is not stated which aspect of suicide is a focus. One study specifically examining suicidal ideation in the context of recurrent depression found that among participants with a history of MDD who reported suicidal ideation during a prior episode of depression, 86% also reported suicidal ideation during a recurrent episode (Williams et al., 2006). These findings underscore the importance of working with patients who have had suicidal ideation during previous episodes while they are currently in remission to prevent or lessen the extent of suicidal ideation during future episodes.

Mindfulness Based Cognitive Therapy (MBCT)

Mindfulness Based Cognitive Therapy (MBCT; Segal, Williams, & Teasdale, 2000) was developed to reduce the risk of recurrence of MDD among those who have suffered from MDD in the past. MBCT is built upon the Mindfulness-Based Stress Reduction (MBSR) program and integrates cognitive-behavioral therapy (CBT) and mindfulness. MBCT differs from CBT because it focuses on shifting one's awareness of thoughts and relationships to thoughts, rather than restructuring thoughts, which is the focus of standard CBT. MBCT has been most widely

studied as an intervention delivered in a group setting that also includes mindfulness exercises for participants to complete at home.

There is an abundance of research investigating MBCT and its different applications. In an early study, MBCT was shown to reduce the risk of relapse for a depressive episode among patients who experienced multiple episodes of recurrent depression (Teasdale et al., 2000). In a randomized controlled trial conducted by Geschwind et al. (2012), MBCT was found to decrease residual depression symptoms independent of the number of previous episodes of depression. Additionally, Segal et al. (2010) examined rates of relapse in patients in remission for MDD who were assigned to maintenance antidepressant medication, placebo, or MBCT. In this study, both MBCT and antidepressant maintenance significantly decreased risk of relapse compared to a placebo; moreover, there was no evidence of a significant difference for protective effects between MBCT and maintenance antidepressants, demonstrating that MBCT is a promising alternative to antidepressants for maintenance of remission (Segal et al., 2010).

Effectiveness of MBCT for Targeting Suicide and Suicidal Ideation

Recent research explored the feasibility of using MBCT to specifically target suicidal ideation and improve depression outcomes among those patients who are at elevated risk based on current or history of suicidal ideation and behavior (Table 1). MBCT has been shown to significantly reduce depression levels among participants who reported suicidal ideation at baseline (Kenny & Williams, 2007). Forkmann et al. (2014) found that MBCT resulted in a significant reduction in self-reported suicidal ideation in patients with residual depression compared to a wait list control group. Barnhofer et al. (2015) found significant differences in the relationships between suicidal thoughts and symptoms of depression; specifically, in the MBCT group, there was a significantly weakened association between depressive symptoms and suicidal

ideation as compared to cognitive psychoeducation and treatment as usual control groups. Additionally, Chesin et al. (2015) created a combined MBCT and safety planning intervention (MBCT-S) for people with suicidal ideation, which significantly reduced suicidal ideation and symptoms of depression. Chesin et al. (2016) also found that group-based MBCT-S improved executive attention and acting with awareness while decreasing rumination and hopelessness in patients reporting severe depression and current suicidal ideation. While these studies suggest that utilizing MBCT may be a promising way to address suicidal ideation, they do not address the question of accessibility of these interventions.

Digital Delivery of MBCT

Digital delivery has been a central focus of efforts to increase the reach of and access to MBCT. In one study focused on the prevention of MDD among people with epilepsy, researchers explored the delivery of an online MBCT intervention in which participants engaged in group telephone or web-based MBCT activities and discussions (Thompson et al., 2015). This resulted in a significant reduction of depressive symptoms and a decreased occurrence of major depressive episodes in the intervention condition compared to treatment as usual (Thompson et al., 2015).

Another line of research has focused on investigating Mindful Mood Balance (MMB), which is an online self-guided program based on MBCT that helps participants disconnect from ruminative and automatic thought patterns to minimize residual depressive symptoms and risk of depressive relapse. In a study of MMB using a propensity matched control group, participants assigned to MMB evidenced significantly reduced severity of depression and residual depressive symptoms compared to usual depression treatment; moreover, these results were maintained throughout a 6-month follow-up (Dimidjian et al., 2014). Based on these early findings, a

randomized controlled trial was conducted to investigate the effect of MMB paired with usual depression care on patients experiencing residual depressive symptoms (Segal et al., 2020). In this trial, MMB was associated with significant decreases in residual depressive symptoms and depressive relapse, along with increased rates of remission compared to usual depression care alone (Segal et al., 2020).

Furthermore, various online interventions designed to reduce suicidal ideation have been explored. One such web-based depression prevention intervention (CATCH-IT) resulted in decreased suicidal ideation in adolescents at risk for depression, with evidence that those who completed the whole CATCH-IT program experienced the strongest effect (Dickter et al., 2019). Think Life, an online cognitive behavioral therapy intervention, also was associated with a significant reduction of suicidal ideation in the intervention group compared to the waitlist control group (De Jaegere et al., 2019). Another study examined the website NowMattersNow.org, which is based on Dialectical Behavioral Therapy (DBT) and features videos of team members discussing their experiences using various skills from DBT to manage suicidal ideation (Whiteside et al., 2019). After one visit to this website, participants reported significantly reduced severity of suicidal thoughts and negative emotions (Whiteside et al., 2019). To date, no studies have investigated the effects of a digital MBCT program on depression or suicidal ideation among patients who experience elevated risk of suicidal thoughts and behaviors.

The Present Study

This present study is a secondary analysis of data from the randomized clinical trial examining the efficacy of the 12-week MMB program paired with the standard depression care pathway (DepCare) compared to DepCare alone at Kaiser Permanente Colorado (KPCO),

reported in Segal et al. (2020). The aim of the present study was to investigate the effects of MMB on suicidal ideation among patients with residual depressive symptoms as well as depressive symptoms and suicidal ideation among a subset of patients with elevated risk based on history of attempted suicide or current suicidal ideation. Drawing on prior studies of in-person MBCT with participants with residual depression symptoms and a history of depression (Barnhofer et al., 2015; Chesin et al., 2015; Forkmann et al., 2014), we hypothesized that the online MMB program would be associated with significantly lower rates of suicidal ideation compared to the DepCare control group among the full sample. Also, based on prior studies of in-person MBCT (Barnhofer et al., 2015; Chesin et al., 2015; Kenny & Williams, 2007), we hypothesized that patients with histories of attempted suicide or current suicidal ideation in the MMB program would evidence significantly lower rates of suicidal ideation and greater improvement in depression severity relative to those assigned to the DepCare only condition.

Methods

Procedure

The protocol for this randomized clinical trial was approved by the University of Toronto, Kaiser Permanente Colorado, and the University of Colorado Boulder Institutional Review Boards. All participants gave informed consent prior to beginning their participation. Participants were randomized to one of the two arms (MMB + DepCare or DepCare alone), and researchers were blinded to the contents of the randomization file. Data were collected via electronic medical records, phone interviews, and online assessments.

Participants

Participants were patients at Kaiser Permanente Colorado, 18 years or older, with one or more prior episodes of MDD and a current Patient Health Questionnaire-9 (PHQ9; Kroenke,

Spitzer, & Williams, 2001) score between 5 and 9. Participants were excluded for diagnoses of schizophrenia, bipolar disorder, current psychosis, organic mental disorder, or pervasive developmental delay. Baseline demographics and clinical characteristics for the full sample ($N=460$) and the CONSORT Flow Diagram are reported in Segal et al. (2020). Baseline demographic and clinical characteristics for the subset of participants with a history of suicide attempt or current suicidal ideation ($N=109$) are reported in Table 2.

Interventions

Mindful Mood Balance

Mindful Mood Balance (MMB) is an MBCT-based online program with 8-sessions involving group-based skills training that center around mindfulness and is self-paced over the span of 12-weeks. Each of these sessions includes a video, experiential practice, and self-reflection. Throughout these sessions, participants learn to disconnect from habitual, automatic, and adverse ways of thinking associated with residual depression. In addition, coaching is offered to increase participant engagement with the program.

Treatment as Usual

Treatment as usual followed the Kaiser Permanente Adult Depression National Care guidelines (DepCare) and included antidepressants and/or psychotherapy pathways informed by PHQ9 (Kroenke, Spitzer, & Williams, 2001) scores. In the context of DepCare, a score of 0-4 indicates no depression, 5-9 indicates mild depression, 10-14 indicates moderate depression, 15-19 indicates moderately severe depression, and a score above 20 indicates severe depression on the PHQ9.

Measures

Depression Severity

The PHQ9 (Kroenke, Spitzer, & Williams, 2001) is a self-report questionnaire with nine items and scores that range from 0 to 27 that is used to assess severity of depression (Kroenke, Spitzer, & Williams, 2001), with higher scores indicating greater severity of depression. Suicidal ideation was measured using item nine (PHQ9-9), which asks participants if they have been bothered by “Thoughts that you would be better off dead, or of hurting yourself in some way” over the past two weeks. Response options include: 0, *not at all*; 1, *several days*; 2, *more than half the days*; 3, *nearly every day*. The PHQ9-9 was chosen as the main outcome measure because it can predict the risk of future suicide attempt and eventual death by suicide across each age group (Rossom et al., 2017). In this study we coded responses to the PHQ9-9 as any score above zero or none. The subset of participants was also partially determined by any score above zero on the PHQ9-9 at baseline which translated to current suicidal ideation. The PHQ9 was administered at baseline and every 2 weeks over the 12-week treatment period.

Demographic and Clinical Characteristics

The demographic and clinical characteristics form was administered at baseline and gathered information about identity variables (e.g., age, race, gender) as well as treatment history and history of suicidal ideation.

Data Analysis

All data analysis was conducted using RStudio. A logistic regression of the full sample ($N=460$) was completed comparing groups on proportion of patients reporting suicidal ideation over the 12-week intervention time period. A second logistic regression of the subset ($N=109$) was completed comparing groups on proportion of patients reporting suicidal ideation over the 12-week intervention time period. A Repeated Measures ANOVA was completed with the subsample ($N=109$) comparing groups on depression severity over the 12-week intervention time

period. For the Repeated measures ANOVA, the independent variable was the treatment group and the dependent variable was total PHQ9 score. Clinical significance for the repeated measures ANOVA model is based on Cohen's *d* effect sizes with 0.2, 0.5, and 0.8 representing small, medium, and large effects respectively (Cohen, 1988).

Results

Within the full sample, the control group, DepCare had a prevalence of 26.73% of any reported suicidal ideation and the MMB group had a prevalence of 18.22% over the 12-week treatment interval (Fig. 1). The logistic regression of the full sample comparing groups on proportion of patients reporting suicidal ideation over the 12-week intervention time period and controlling for baseline depression severity scores yielded a statistically significant treatment effect ($z=-2.24$, $p=.025$, $OR=0.555$, 95% CI [0.328-0.924]). The odds of any patient reporting suicidal ideation over the 12-week intervention period was 44.50% lower for the MMB treatment group compared to DepCare alone. (Fig. 1).

For the subset of elevated risk patients, DepCare had a prevalence of 53.70% of any reported suicidal ideation whereas the MMB group had a prevalence of 44.44% over the 12-week treatment interval (Fig. 2). There were no statistically significant differences between groups from the logistic regression comparing proportion of patients reporting suicidal ideation over the 12-week intervention time period ($z=-1.24$, $p=0.214$, $OR=0.549$, 95% CI [0.207, 1.392]). The odds of reporting suicidal ideation over the 12-week intervention period was 45.10% lower for the MMB treatment group compared to DepCare alone (Fig. 2). For the subset analysis of elevated risk patients, the repeated measures ANOVA estimated an on-average significant difference between the groups over the longitudinal period; the MMB group was 1.42

($se=0.58$) units below the control group (DepCare) on-average ($t(504)=-2.44, p=0.015, d=0.47$, 95% CI (0.28-1.04) (see Fig. 3).

Discussion

Consistent with our hypothesis, MMB was associated with a reduced proportion of patients reporting suicidal ideation during the intervention period. There were no statistically significant effects found in reported suicidal ideation among the subset of patients who entered the study with elevated risk based on current suicidal ideation or history of suicide attempt; however, there was evidence of significantly reduced depression severity among these participants. This study extends the analysis of the full sample reported in Segal et al. (2020) that found a statistically significant reduction of residual depression symptoms during the treatment period in the MMB treatment group compared to the usual depression care control group. Altogether, these findings suggest MMB is a promising and accessible evidence-based intervention for suicidal ideation and depression severity among patients with residual depression symptoms and, specifically, among those at elevated risk for suicidal ideation.

These findings imply that the online delivery of the core skills of MBCT is a promising vehicle to increase access to the benefits of in-person MBCT as an intervention for suicidal ideation in patients with residual depression symptoms (Barnhofer et al., 2015; Chesin et al., 2015; Forkmann et al., 2014) and as an intervention for depression in patients with a history of attempted suicide or current suicidal ideation (Barnhofer et al., 2015; Chesin et al., 2015; Kenny & Williams, 2007).

Although this study did not test how the MMB program targets suicidal ideation, other studies have examined this question. One common reason that people experience suicidal ideation is the desire for an escape from severe emotional pain that can accompany depression or

aversive life events (Luoma & Villatte 2012). In an attempt to cope with such pain, individuals may engage in experiential avoidance, which is actively avoiding certain internal experiences including sensations in the body, thoughts, and emotions (Hayes et al., 1996). Mindfulness is thought to be an effective intervention for suicide prevention because it targets experiential avoidance by supporting a willingness to experience rather than suppression of painful emotions and thoughts (Luoma & Villatte, 2012). These skills are emphasized throughout the MMB program, suggesting that the development of mindfulness skills and reduced experiential avoidance may be an effective way to reduce suicidal ideation.

One limitation of the generalizability of this study is the lack of diversity of both the full sample and the subset. The majority of the participants in both samples identified as White and most had received some type of higher education. It is also important to note that this study was not designed to test effects within the elevated risk group; thus, future studies should test effects within this population with adequate and diverse sample sizes. Additionally, this study looked at the proportion of patients with suicidal ideation, which is a gross measure of suicidal ideation. There is a lack of knowledge about the differences between patients who report suicidal ideation with and without suicidal behavior (Williams et al., 2006), and this study does not advance such knowledge as we had information only about ideation and not behavior. In addition, more granular information about the level of risk, including suicidal behavior, among participants who report suicidal ideation would be helpful. Finally, it is important to know if any benefits of the MMB program persist after 12 weeks; continuing this research to include outcomes at a follow-up period after MMB would uncover any lasting effects of MMB on the high-risk population and on suicidal ideation. Also, it will be important to examine strategies to promote adherence to the

MMB program and to examine if differences in dropout influence the pattern of results since there was higher dropout among MMB participants in this study.

As the first study to examine the effects of mindfulness-based cognitive therapy delivered online on suicidal ideation, this study provides critical information about the possibility of expanding the reach of such interventions to individuals at risk. Some in-person programs have utilized modified MBCT that includes safety planning (MBCT-S) to specifically address suicidality, but these have not been explored in a web-based format (Chesin et al., 2015). The accessibility of interventions for suicidal ideation is an increasingly important factor in research because most individuals living with suicidal ideation do not receive treatment (Bruffaerts et al., 2011). Analysis of the World Health Surveys from the World Health Organization (WHO) found that 15% of patients with suicidal ideation who were not receiving treatment listed structural barriers such as cost, transportation, and inconvenience as reasons for not seeking treatment (Bruffaerts et al., 2011). The increased convenience associated with the online availability of the MMB program is a promising format for interventions serving the at-risk population detailed in this study. Adapting the MMB program to include safety planning could take this research to the next level and help determine which aspects of this treatment improve suicidal ideation. The promise of MMB as an intervention for suicidal ideation provides the basis for future investigations and hope for people who experience residual depression and suicidal ideation.

References

- American Psychiatric Association. (2013). *Diagnostic and statistical manual of mental disorders (DSM-5)*. American Psychiatric Pub.
- Barnhofer, T., Crane, C., Brennan, K., Duggan, D. S., Crane, R. S., Eames, C., Radford, S., Silverton, S., Fennell, M. J. V., Williams, J. M. G. (2015). Mindfulness-Based Cognitive Therapy (MBCT) Reduces the association between depressive symptoms and suicidal cognitions in patients with a history of suicidal depression. *Journal of Consulting and Clinical Psychology, 83*(6), 1013–1020. <https://doi.org/10.1037/ccp0000027>
- Bruffaerts, R., Demyttenaere, K., Hwang, I., Chiu, W., Sampson, N., Kessler, R., Alonso, J., Borges, G., de Girolamo, G., de Graaf, R., Florescu, S., Gureje, O., Hu, C., Karam, E. G., Kawakami, N., Kostyuchenko, S., Kovess-Masfety, V., Lee, S., Levinson, D., Matschinger, H., Posada-Villa, J., Sagar, R., Scott, K. M., Stein, D.J., Tomov, T., Viana, M. C., Nock, M. (2011). Treatment of suicidal people around the world. *British Journal of Psychiatry, 199*(1), 64-70. doi:10.1192/bjp.bp.110.084129
- Chesin, M. S., Benjamin-Phillips, C. A., Keilp, J., Fertuck, E. A., Brodsky, B. S., & Stanley, B. (2016). Improvements in executive attention, rumination, cognitive reactivity, and mindfulness among high-suicide risk patients participating in adjunct mindfulness-based cognitive therapy: Preliminary Findings. *Journal of Alternative and Complementary Medicine, 22*(8), 642–649. <https://doi.org/10.1089/acm.2015.0351>
- Chesin, M. S., Sonmez, C. C., Benjamin-Phillips, C. A., Beeler, B., Brodsky, B. S., & Stanley, B. (2015). Preliminary effectiveness of adjunct mindfulness-based cognitive therapy to prevent suicidal behavior in outpatients who are at elevated suicide risk. *Mindfulness, 6*(6), 1345–1355. <https://doi.org/10.1007/s12671-015-0405-8>

Cohen, J., *Statistical Power Analysis for the Behavioral Sciences*. 2nd ed. Hillsdale, NJ:

Lawrence Erlbaum Associates; 1988.

Crosby AE, Ortega L, Melanson C. 2011. *Self-Directed Violence Surveillance: Uniform Definitions and Recommended Data Elements (Version 1.0)*. Atlanta, GA: Centers for Disease Control, National Center for Injury Prevention and Control.

<https://stacks.cdc.gov/view/cdc/11997>

De Jaegere, E., van Landschoot, R., van Heeringen, K., van Spijker, B. A. J., Kerkhof, A. J. F. M., Mokkenstorm, J. K., & Portzky, G. (2019). The online treatment of suicidal ideation: A randomised controlled trial of an unguided web-based intervention. *Behaviour Research and Therapy*, 119(May), 103406. <https://doi.org/10.1016/j.brat.2019.05.003>

Dickter, B., Bunge, E. L., Brown, L. M., Leykin, Y., Soares, E. E., Van Voorhees, B., Marko-Holguin, M., Gladstone, T. R. G. (2019). Impact of an online depression prevention intervention on suicide risk factors for adolescents and young adults. *MHealth*, 5, 11–11. <https://doi.org/10.21037/mhealth.2019.04.01>

Dimidjian, S., Beck, A., Felder, J. N., Boggs, J. M., Gallop, R., & Segal, Z. V. (2014). Web-based Mindfulness-based Cognitive Therapy for reducing residual depressive symptoms: An open trial and quasi-experimental comparison to propensity score matched controls. *Behaviour Research and Therapy*, 63, 83–89. <https://doi.org/10.1016/j.brat.2014.09.004>

Forkmann, T., Wichers, M., Geschwind, N., Peeters, F., Van Os, J., Mainz, V., & Collip, D. (2014). Effects of mindfulness-based cognitive therapy on self-reported suicidal ideation: Results from a randomised controlled trial in patients with residual depressive symptoms. *Comprehensive Psychiatry*, 55(8), 1883–1890. <https://doi.org/10.1016/j.comppsy.2014.08.043>

- Geschwind, N., Peeters, F., Huibers, M., Van Os, J., & Wichers, M. (2012). Efficacy of mindfulness-based cognitive therapy in relation to prior history of depression: Randomised controlled trial. *British Journal of Psychiatry*, 201(4), 320–325. <https://doi.org/10.1192/bjp.bp.111.104851>
- Hayes SC, Wilson KG, Gifford EV, Follette VM, Strosahl K. Experiential avoidance and behavioral disorders: A functional dimensional approach to diagnosis and treatment. *Journal of Consulting and Clinical Psychology*. 1996;64:1152–1168. <http://dx.doi.org/10.1037/0022-006X.64.6.1152>
- Heron, M. (2019). Deaths: leading causes for 2017. *National Vital Statistics Reports*, 68(6), 1–77. <https://stacks.cdc.gov/view/cdc/79488>
- Isometsä, E. T., Henriksson, M. M., Aro, H. M., Heikkinen, M. E., Kuoppasalmi, K. I., & Lönnqvist, J. K. (1994). Suicide in major depression. *American Journal of Psychiatry*, 151(4), 530–536. <https://doi.org/10.1176/ajp.151.4.530>
- Kenny, M. A., & Williams, J. M. G. (2007). Treatment-resistant depressed patients show a good response to Mindfulness-based Cognitive Therapy. *Behaviour Research and Therapy*, 45(3), 617–625. <https://doi.org/10.1016/j.brat.2006.04.008>
- Kroenke, K., Spitzer, R. L., & Williams, J. B. W. (2001). The PHQ-9-Validity of a brief depression severity measure. *Journal of General Internal Medicine*, 16(9), 606-613. <https://doi.org/10.1046/j.1525-1497.2001.016009606.x>
- Luoma, J. B., & Villatte, J. L. (2012). Mindfulness in the Treatment of suicidal individuals. *Cognitive and Behavioral Practice*, 19(2), 265–276. doi:10.1016/j.cbpra.2010.12.003

Nordström, P., Åsberg, M., Åberg-Wistedt, A., & Nordin, C. (1995). Attempted suicide predicts suicide risk in mood disorders. *Acta Psychiatrica Scandinavica*, *92*(5), 345–350.

<https://doi.org/10.1111/j.1600-0447.1995.tb09595.x>

Oquendo, M. A., Currier, D., & Mann, J. J. (2006). Prospective studies of suicidal behavior in major depressive and bipolar disorders: What is the evidence for predictive risk factors?

Acta Psychiatrica Scandinavica, *114*(3), 151–158. [https://doi.org/10.1111/j.1600-](https://doi.org/10.1111/j.1600-0447.2006.00829.x)

[0447.2006.00829.x](https://doi.org/10.1111/j.1600-0447.2006.00829.x)

Rebecca C Rossom, MD, MS, Karen J Coleman, PhD, Brian K Ahmedani, PhD, Arne Beck,

PhD, Eric Johnson, MS, Malia Oliver, BA, and Greg E Simon, MD, M. (2017). Suicidal

Ideation reported on the PHQ9 and risk of suicidal behavior across age groups.

Physiology & Behavior, *176*(3), 139–148. <https://doi.org/10.1016/j.physbeh.2017.03.040>

Segal, Z. V., Bieling, P., Young, T., MacQueen, G., Cooke, R., Martin, L., Bloch, R., Levitan, R. D. (2010). Antidepressant monotherapy vs sequential pharmacotherapy and mindfulness-

based cognitive therapy, or placebo, for relapse prophylaxis in recurrent depression.

Archives of General Psychiatry, *67*(12), 1256–1264.

Segal, Z. V., Dimidjian, S., Beck, A., Boggs, J. M., Vanderkruik, R., Metcalf, C. A., Gallop, R., Felder, J., Levy, J. (2020). Outcomes of Online mindfulness-based cognitive therapy for

patients with residual depressive symptoms. *JAMA Psychiatry*.

<https://doi.org/10.1001/jamapsychiatry.2019.4693>

Substance Abuse and Mental Health Services Administration. (2019). Key substance use and mental health indicators in the United States: Results from the 2018 National Survey on Drug Use and Health (HHS Publication No. PEP19-5068, NSDUH Series H-54).

- Rockville, MD: Center for Behavioral Health Statistics and Quality, Substance Abuse and Mental Health Services Administration. <https://www.samhsa.gov/data/>
- Substance Abuse and Mental Health Services. (n.d.). Results from the 2018 National Survey on Drug Use and Health: Detailed Tables. <https://www.samhsa.gov/data/sites/default/files/cbhsq-reports/NSDUHDetailedTabs2018R2/NSDUHDetTabsSect8pe2018.htm>
- Teasdale, J. D., Segal, Z. V., Williams, J. M. G., Ridgeway, V. A., Soulsby, J. M., & Lau, M. A. (2000). Prevention of relapse/recurrence in major depression by mindfulness-based cognitive therapy. *Journal of Consulting and Clinical Psychology, 68*(4), 615–623. <https://doi.org/10.1037/0022-006X.68.4.615>
- Thompson, N. J., Patel, A. H., Selwa, L. M., Stoll, S. C., Begley, C. E., Johnson, E. K., & Fraser, R. T. (2015). Expanding the efficacy of project UPLIFT: Distance delivery of mindfulness-based depression prevention to people with epilepsy. *Journal of Consulting and Clinical Psychology, 83*(2), 304–313. <https://doi.org/10.1037/a0038404>
- Whiteside, U., Richards, J., Huh, D., Hidalgo, R., Nordhauser, R., Wong, A. J., Zhang X, Luxton DD, Ellsworth M, Lezine, D. (2019). Development and Evaluation of a web-based resource for suicidal thoughts: NowMattersNow.org. *Journal of Medical Internet Research, 21*(5), e13183. <https://doi.org/10.2196/13183>
- Williams, J. M. G., Crane, C., Barnhofer, T., Van Der Does, A. J. W., & Segal, Z. V. (2006). Recurrence of suicidal ideation across depressive episodes. *Journal of Affective Disorders, 91*(2–3), 189–194. <https://doi.org/10.1385/BTER:109:2:189>

Table 1
Prior Studies of MBCT addressing Suicidal Ideation

Paper	Subset	N	Depression Outcomes	Suicide Outcomes
Barnhofer et al. (2015)	≥3 MDE; history of suicidal ideation or behavior	MBCT <i>n</i> =77; CPE <i>n</i> =78; TAU <i>n</i> =39	Beck-Depression Inventory-II	Suicidal Cognitions Scale
Chesin et al. (2015)	Current suicidal ideation; history of serious suicidal ideation; suicide attempt within 6 months	<i>n</i> =18	Beck-Depression Inventory-II	Scale for Suicide Ideation-Current
Forkmann et al. (2014)	Residual depressive symptoms	MBCT <i>n</i> =64; Waitlist Control <i>n</i> =66	Hamilton Depression Rating Scale	Inventory of Depressive Symptoms
Kenny & Williams (2007)	MDD; subset: current suicidal ideation	Total <i>n</i> = 50; Subset <i>n</i> =32	Beck-Depression Inventory	-

Notes: MDE=Major Depressive Episode; MBCT= Mindfulness Based Cognitive Therapy; CPE= Cognitive Psychoeducation; TAU= Treatment as Usual; MDD= Major Depressive Disorder

Table 2
Subset Sample Baseline Characteristics

Characteristic	Group		
	MMB + DepCare (n=49)	DepCare Only (n=60)	Total (n=109)
Age, mean (SD)	45.22 (16.38)	45.83 (14.29)	45.55 (15.22)
Sex, No. (%)			
Male	15 (30.61)	15 (25.42)	30 (27.78)
Female	34 (69.39)	44 (74.58)	78 (72.22)
Education, No. (%)			
Did not complete High School	1 (2.04)	1 (1.69)	2 (1.85)
Completed High School	8 (16.33)	5 (8.47)	13 (12.04)
College or University	23 (46.94)	30 (50.85)	53 (49.07)
Graduate or Professional School	17 (34.69)	23 (38.98)	40 (37.04)
Race, No. (%)			
American Indian or Alaska Native	0	0	0
Asian	0	3 (5.08)	3 (2.80)
Black or African American	0	1 (1.67)	1 (0.93)
Native Hawaiian or Pacific Islander	0	1 (1.67)	1 (0.93)
White	47 (97.92)	52 (88.14)	99 (92.52)
Other	1 (2.08)	2 (3.39)	3 (2.80)
Hispanic or Latino, No. (%)	6 (13.04)	8 (14.04)	14 (13.59)
Marital Status, No. (%)			
Never Married	15 (31.25)	12 (20.69)	27 (25.47)
Married	20 (41.67)	25 (43.10)	45 (42.45)
Registered Domestic Partnership, Civil Union, Common-Law Marriage	0	2 (3.45)	2 (1.89)

Divorced	11 (22.92)	14 (24.14)	25 (23.58)
Separated	2 (4.17)	3 (5.17)	5 (4.72)
Widowed	0	2 (3.45)	2 (1.89)
<hr/>			
Annual Income, No. (%)			
\$0- \$29,999	6 (12.24)	5 (8.33)	11 (10.28)
\$30,000- \$69,999	21 (42.86)	30 (50.0)	51 (47.66)
\$70,000- \$99,999	5 (10.2)	12 (20.0)	17 (15.89)
≥ \$100,000	16 (32.65)	12 (20.0)	28 (26.17)
<hr/>			
Employment, No. (%)			
Full-time Employed	30 (61.22)	28 (47.46)	58 (53.70)
Part-time Employed	7 (14.29)	14 (23.73)	21 (19.44)
Retired	8 (16.33)	9 (15.25)	17 (15.74)
Disabled	2 (4.08)	2 (3.39)	4 (3.70)
Full-time Student	2 (4.08)	1 (1.69)	3 (2.78)
Part-time Student	2 (4.08)	3 (5.08)	5 (4.63)
Homemaker	2 (4.08)	3 (5.08)	5 (4.63)
Unemployed	0	3 (5.08)	3 (2.78)
Other	1 (2.04)	2 (3.39)	3 (2.78)
<hr/>			
Previous Suicide Attempt, No. (%)	39 (79.59)	43 (72.88)	82 (75.93)
<hr/>			
PHQ9, mean (SD)	7.18 (1.54)	7.65 (1.54)	7.44 (1.55)
<hr/>			
Any PHQ9-9 score above zero, No. (%)	19 (38.77)	22 (37.29)	41(37.96)

Notes: MMB = Mindful Mood Balance; DepCare = Usual Depression Care; PHQ9 = Patient Health Questionnaire-9; PHQ9-9 = item 9 on the Patient Health Questionnaire

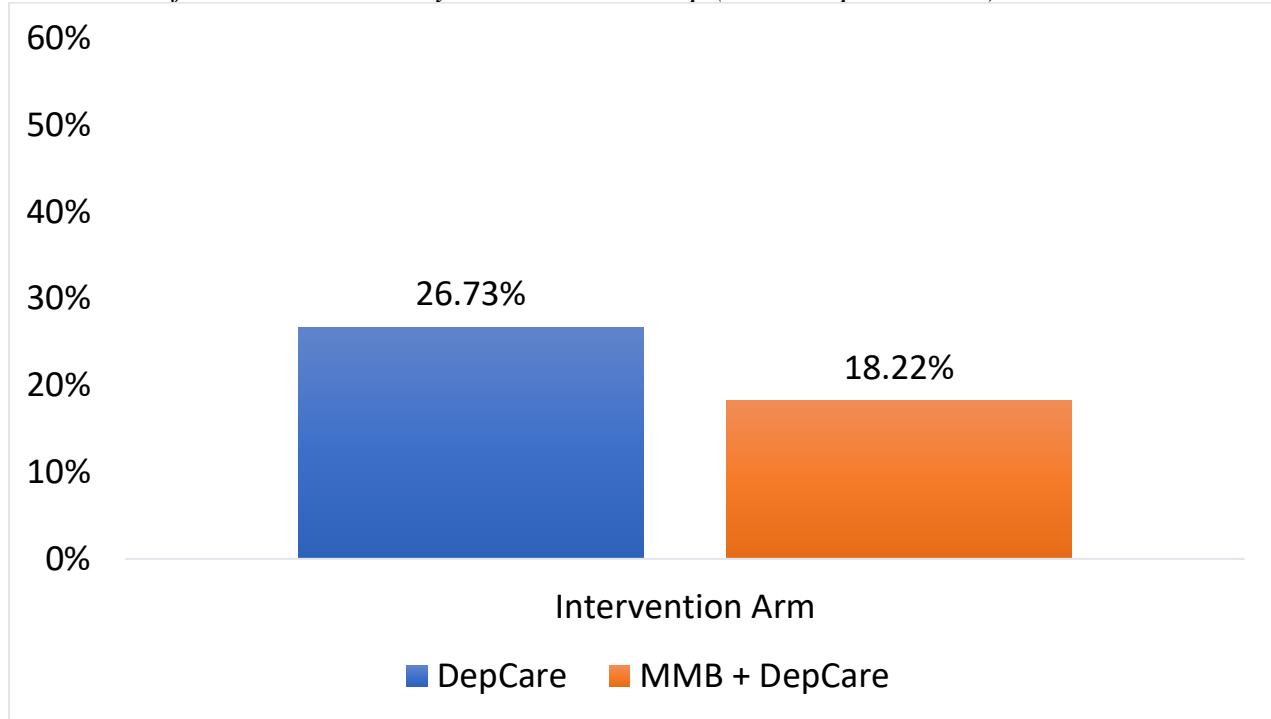
Table 3*Descriptive Data for PHQ9 Scores by Group over Time Within the Subset*

Assessment Point	MMB + DepCare		DepCare	
	<i>N</i>	Mean (SD)	<i>N</i>	Mean (SD)
0.0	49	7.18 (1.54)	60	7.65 (1.54)
0.5	45	7.02 (3.14)	54	8.53 (3.82)
1.0	38	5.92 (3.25)	52	7.39 (3.86)
1.5	35	6.63 (3.49)	52	8.33 (4.54)
2.0	29	6.10 (3.68)	50	7.39 (3.51)
2.5	33	4.90 (3.63)	49	6.89 (3.58)
3.0	29	5.51 (3.18)	50	8.99 (5.21)

Notes: MMB = Mindful Mood Balance; DepCare = Usual Depression Care

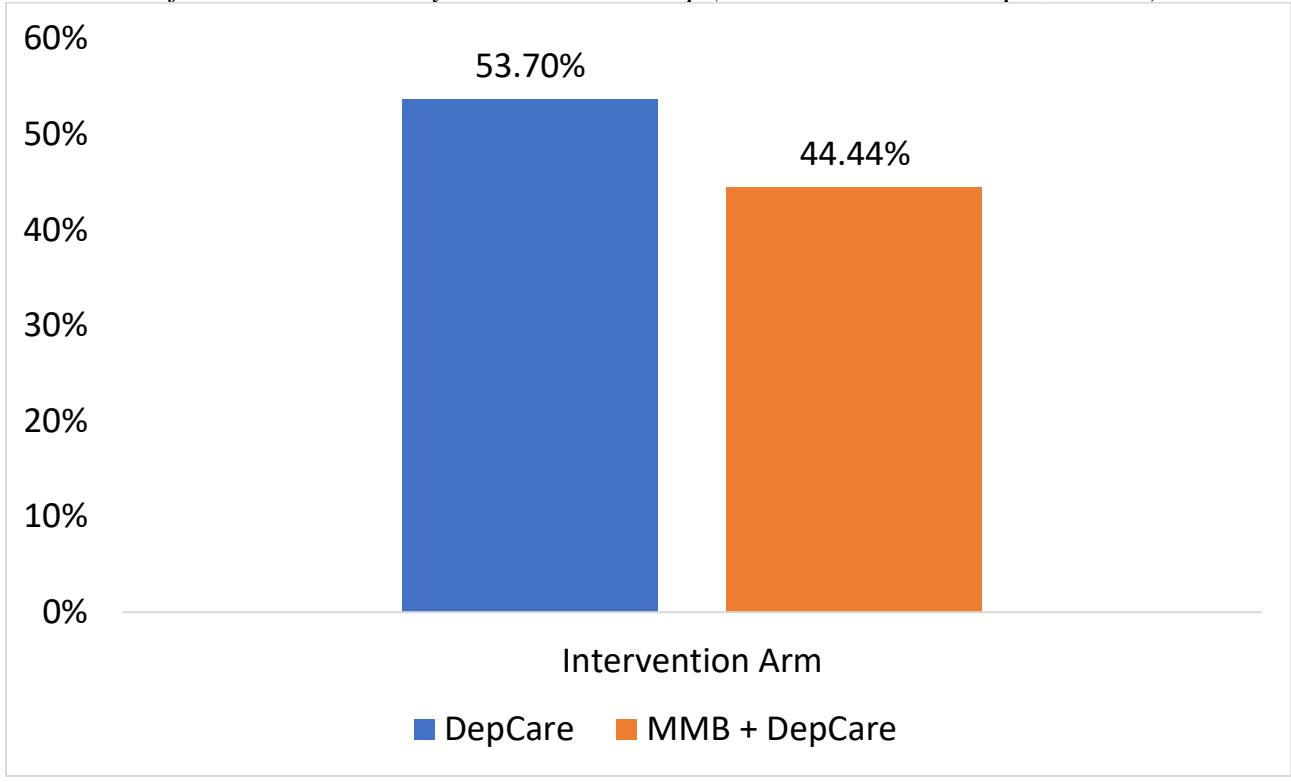
Figure 1

Prevalence of Suicidal Ideation by Intervention Group (Full Sample, N=460)



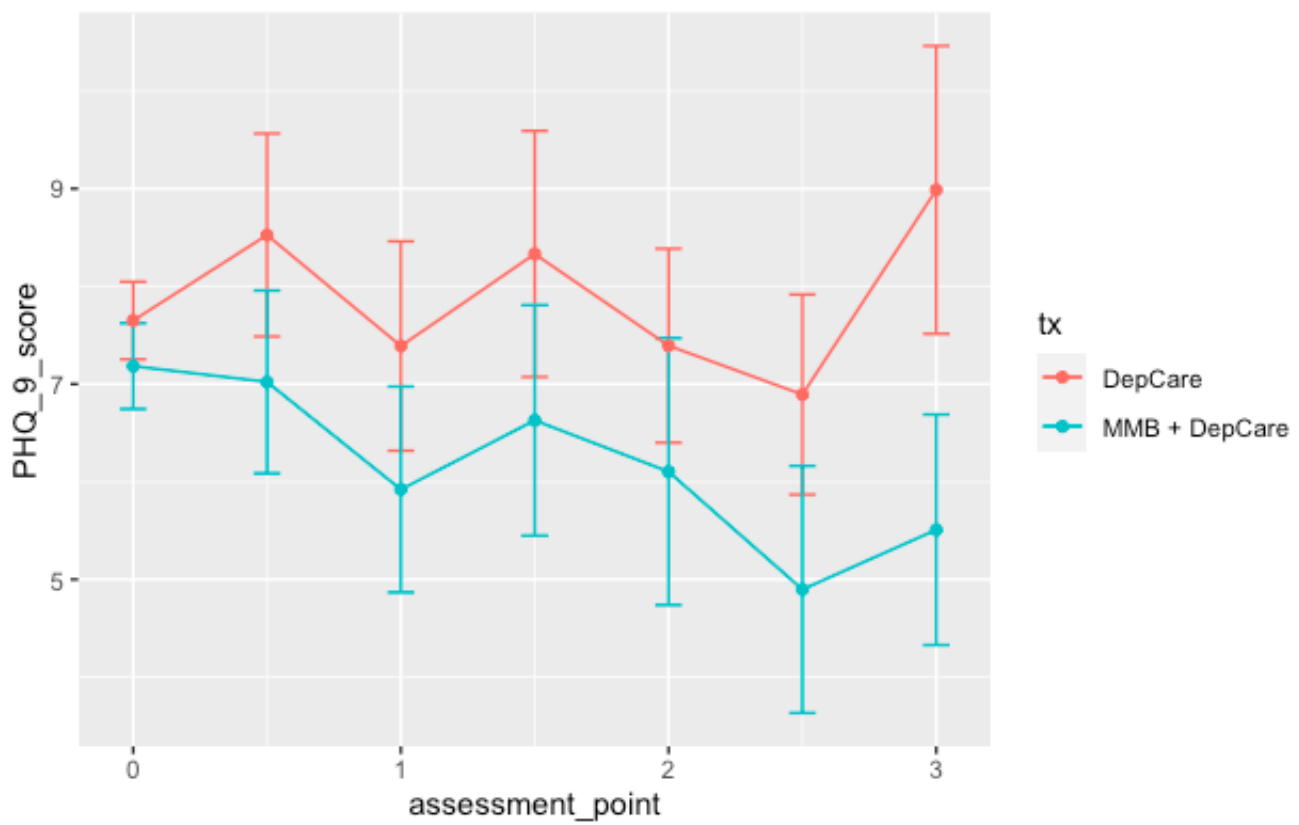
Notes: DepCare= Usual Depression Care; MMB + DepCare = Mindful Mood Balance + Usual Depression Care

Figure 2
Prevalence of Suicidal Ideation by Intervention Group (Elevated Risk Subsample, N=109)



Notes: DepCare= Usual Depression Care; MMB + DepCare = Mindful Mood Balance + Usual Depression Care

Figure 3
Depressive Symptom Severity Over Time by Intervention Group (Elevated Risk Subsample, N=109)



Notes: DepCare= Usual Depression Care; MMB + DepCare = Mindful Mood Balance + Usual Depression Care