
Mindfulness Intervention for Child Abuse Survivors



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Twenty-seven adult survivors of childhood sexual abuse participated in a pilot study comprising an 8-week mindfulness meditation-based stress reduction (MBSR) program and daily home practice of mindfulness skills. Three refresher classes were provided through final follow-up at 24 weeks. Assessments of depressive symptoms, post-traumatic stress disorder (PTSD), anxiety, and mindfulness, were conducted at baseline, 4, 8, and 24 weeks. At 8 weeks, depressive symptoms were reduced by 65%. Statistically significant improvements were observed in all outcomes post-MBSR, with effect sizes above 1.0. Improvements were largely sustained until 24 weeks. Of three PTSD symptom criteria, symptoms of avoidance/numbing were most greatly reduced. Compliance to class attendance and home practice was high, with the intervention proving safe and acceptable to participants. These results warrant further investigation of the MBSR approach in a randomized, controlled trial in this patient population. © 2009 Wiley Periodicals, Inc. *J Clin Psychol* 66: 17–33, 2010.

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Introduction

Childhood Sexual Abuse

It is estimated that over a quarter of adult women in the United States are victims of childhood sexual abuse (CSA; Briere & Elliott, 2003; Diehl & Prout, 2002; Felitti et al., 1998; Lev-Wiesel, 2008), resulting in potentially enormous psychological scars that can remain across the lifetime (Diehl & Prout, 2002; Polusny & Follette, 1995). Depression and post-traumatic stress disorder (PTSD) are common in these trauma survivors (Breslau, Davis, Peterson, & Schultz, 2000; Lev-Wiesel, 2008), occurring often not as isolated conditions, but embedded in a complex trauma spectrum that includes anxiety, substance abuse, self-efficacy, sleep issues, and somatic complaints (Breslau, 2002; Breslau et al., 2000; Diehl & Prout, 2002; van der Kolk, Roth, Pelcovitz, Sunday, & Spinazzola, 2005).

Psychological treatment for CSA survivors comprises traditional psychotherapy, such as psychodynamic and supportive therapy (Bisson & Andrew, 2007), as well as cognitive-behavioral therapy approaches for PTSD (Harvey, Bryant, & Tarrrier, 2003). Prolonged exposure therapy (PE) and a variation of it, cognitive processing therapy (CPT) share a strong evidence base (Foa et al., 1999; Foa, Rothbaum, Riggs, & Murdock, 1991; Resick, Monson, & Chard, 2007; Resick, Nishith, & Griffin, 2003). However, exposure therapy has not been shown equivocally to surpass other approaches for PTSD (Bisson & Andrew, 2007; Bryant, Moulds, Guthrie, Dang, & Nixon, 2003; Marks, Lovell, Noshirvani, Livanou, & Thrasher, 1998; Rothbaum, Astin, & Marsteller, 2005). That CPT was found to be equally effective with and without its exposure component supports this (Resick et al., 2008). The case has been made that exposure therapy is not suitable for all, with some patients and therapists not willing to face its inherent distress, despite evidence of ultimate success (Follette, 2006; Orsillo & Batten, 2005; Rosen et al., 2004).

Recently, therapies incorporating mindfulness skills have been studied. Acceptance and commitment therapy (ACT) offers a combination of cognitive-behavioral therapy, behavioral psychology, and mindfulness training (Hayes, Luoma, Bond, Masuda, & Lillis, 2006). ACT has been proposed as a treatment for PTSD (Follette, 2006; Orsillo & Batten, 2005; Walser & Westrup, 2007), but as yet no clinical trials have been published. Dialectical behavioral therapy (DBT) is a proven approach that utilizes mindfulness skills primarily in treatment of borderline personality disorder (Linehan, 2000), but few data are available on its use in the treatment of PTSD. ACT and DBT are generally practiced in one-on-one therapeutic sessions. Given the vast need of services for CSA trauma survivors, increased focus on reducing healthcare costs, and the potential role of mindfulness in facilitating healing, a group-based mindfulness method that may be more cost-effective, less confronting, and is evidence-based could be an appealing choice. One such potential program is mindfulness-based stress reduction (MBSR; Kabat-Zinn, 1982).

Mindfulness-Based Stress Reduction

MBSR has been shown in several studies to be effective in reducing trauma spectrum symptoms such as depression, psychological distress, anxiety, sleep, and

somatic complaints (Carlson & Garland, 2005; Grossman, Niemann, Schmidt, & Walach, 2004; Kabat-Zinn, 1982; Kabat-Zinn, Lipworth, & Burney, 1985; Kabat-Zinn, Lipworth, Burney, & Sellers, 1987; Kabat-Zinn et al., 1992; Miller, Fletcher, & Kabat-Zinn, 1995; Pradhan et al., 2007; Shapiro, Bootzin, Figueredo, Lopez, & Schwartz, 2003; Williams, Teasdale, Segal, & Kabat-Zinn, 2007). Neuroscience research has shown MBSR to be associated with functional brain changes and emotional and attention improvements (Davidson et al., 2003; Jha, Krompinger, & Baime, 2007). *Mindfulness* is described as moment-to-moment, non-judgmental attention and awareness actively cultivated and developed through meditation (Kabat-Zinn, 2003). By continually bringing the mind back to present moment awareness, mindfulness practice is thought to increase clarity, attention, calmness, and emotional well-being. Didactic course material is presented to engage awareness of the relative and malleable nature of thoughts and judgments in a manner influenced by cognitive-behavioral therapy (Segal, Williams, & Teasdale, 2002).

The efficacy of MBSR in reducing depressive and PTSD symptoms among trauma survivors has not yet been established. Work toward this end currently is underway in military and domestic abuse populations (King, 2008; Dutton, 2008). At present, however, no study found in the literature has investigated the effect of MBSR with CSA survivors on depressive and PTSD symptoms or other psychological outcomes. To begin the process of testing MBSR for this indication, we conducted a feasibility pilot study of MBSR among adult CSA trauma survivors. We hypothesized that participation in MBSR would be associated with improvements in depressive symptoms at 8 weeks, the study's primary outcome. We also hypothesized that participation in MBSR would be associated with improvements in secondary outcomes of PTSD and anxiety symptoms, and mindfulness.

Methods

Participants

Adult CSA survivors were recruited through advertisements in Baltimore newspapers and radio, informational flyers widely distributed through the state chapter of registered social workers, CSA survivor networks and advocacy groups, and in community health fairs. Respondents were screened by telephone and, if eligible, were invited to the baseline session. Inclusion criteria included a history of CSA, being aged 21 or older, and having a score at baseline on the General Severity Index of the Brief Symptoms Inventory ≥ 0.50 . It is likely that thousands of CSA survivors have been enrolled in public MBSR courses since its inception in the early 1970's. However, because this was the first research study, of which we were aware, to use MBSR exclusively with CSA survivors, we wanted to take all possible precautions for participant well-being. For this reason, all participants were required to be in concurrent psychotherapy with a licensed practitioner. We felt this would allow a safety net as well as a venue in which to process insights that arose in meditation or in the MBSR class. After supplying information to the therapists about the study, a requirement of enrollment was that therapists provide assent for their client's participation. Exclusion criteria included major psychiatric illness such as borderline personality disorder or schizophrenia. Clear dissociative identity disorder manifested as multiple personalities was excluded, while participants with dissociative identity not otherwise specified were included. Potential participants also were excluded for active alcohol or drug dependency, inability to attend study sessions, participation in

a concurrent clinical trial, or scheduled major surgery. All patients remained on their prescribed medication and under the regular care of their therapists throughout the study.

Procedure

Participants deemed eligible following baseline were asked to participate in the MBSR class for 8 weeks, followed by an 8-week assessment visit. The intervention then continued with participants invited to three MBSR refresher classes over 4 months, with the final assessment made 24 weeks post-baseline. Three cohorts of participants took part: cohort 1 ($n = 9$) took place during May–November 2007, cohort 2 ($n = 7$) during October 2007–April 2008, and cohort 3 ($n = 11$) during February–August 2008. Adverse events were monitored at each visit and were reported in accordance with procedures of the University of Maryland Human Research Protections Office, which approved the protocol (H-28934). All participants provided written informed consent.

Outcome Measures

Depressive symptoms were measured by the Beck Depression Inventory Second Edition (BDI-II) (Beck, Steer, Ball, & Ranieri, 1996; Beck, Steer, & Brown, 1996). The BDI-II is a widely used, standardized, and validated self-report measure of depressive symptom severity. The 21-item scale addresses affective, behavioral, biological, cognitive, and motivational symptoms of depression in a series of statements that are rated from 0 to 3 to indicate the severity of symptoms. The summary score ranges from 0–63, with those in the range of 0–13 indicating minimal depression, 14–19 mild, 20–28 moderate, and 29–63 severe (Beck, Steer, & Brown, 1996).

PTSD was measured by the PTSD checklist (PCL; Weathers et al., 1994). This widely used, 17-item self-report scale was developed by the National Center for PTSD. The PCL score is the sum of points from all 17 items on the questionnaire, which are rated as *not at all*, *a little bit*, *moderately*, *quite a bit*, or *extremely* over the past month on a 1–5 scale, respectively. The score ranges from 17 to 85, with higher scores indicating greater symptom distress. The diagnostic properties of the PCL have been validated and replicated (Blanchard, Jones-Alexander, Buckley, & Forneris, 1996). The PCL also has been validated as a tool for identifying the presence or diagnosis of PTSD, using an algorithm based on the DSM-IV criteria for PTSD and validated against the gold-standard Clinician-Administered PTSD Scale (Blanchard et al., 1996). The algorithm counts the number of items on the PCL endorsed as *moderately* or worse in each of the three PTSD symptom clusters: criterion B (reexperiencing), criterion C (avoidance/numbing), and criterion D (hyperarousal). A diagnosis of PTSD is made if the participant has one or more positive symptoms in criterion B, three or more in criterion C, and two or more in criterion D (Blanchard et al., 1996).

Anxiety was measured using the Brief Symptom Inventory (BSI; Derogatis & Melisaratos, 1983). The BSI includes a reliable and valid subscale for assessment of anxiety. Scores on the anxiety subscale range from 0–4, with higher levels indicating greater distress. The BSI also contains a summary measure of overall psychological distress, called the general severity index (GSI). The GSI was used in the baseline assessment as a screening tool. Those who scored less than 0.50 on the GSI were ineligible for the study. This cut-off for psychological distress was based on our

previous study of MBSR with rheumatoid arthritis patients, where we observed an apparent floor effect associated with low baseline levels of psychological distress in the sample (Pradhan et al., 2007).

Mindfulness was measured by the Mindfulness Attention Awareness scale (MAAS; Brown & Ryan, 2003). This scale was designed to assess the state of mindfulness by evaluating one of its core characteristics, attention to what is taking place in the present. Scores on the MAAS have been shown to increase during mindfulness-based interventions and are associated with higher positive affect and psychological health (Brown & Ryan, 2003; Carlson & Brown, 2005). The range of the MAAS score is 1–6, with higher scores indicating greater mindfulness.

Adherence to home practice was recorded on practice logs. Each day, participants were asked to record the total number of minutes spent on five home practices (sitting meditation, walking meditation, the body scan, gentle yoga, and informal practices). Seven days of practice were recorded on one form and handed in on a weekly basis. Attendance at classes, the retreat, and refresher sessions was monitored.

Qualitative data were collected at 4 weeks and 8 weeks, eliciting the participants' views on the MBSR program and how it may or may not have impacted their lives. These data will be described in another setting.

Intervention

The MBSR intervention used in this study followed the manual developed at the University of Massachusetts Medical School.

Classes and homework. The MBSR course comprised 8 weekly, 2.5–3-hour classes, and a 5-hour silent retreat. Formal meditation practices were introduced in four formats: (a) sitting meditation, using aspects of the present moment as anchors of attention (such as breath, sound, body sensations, or open awareness), as well as a guided meditation to cultivate compassionate well wishes for self and others (*sitting meditation*); (b) a progressive body awareness meditation (*body scan*); (c) contemplative walking (*walking meditation*); and (d) gentle yoga stretching exercises (*gentle yoga*). In addition, participants were asked to carry out certain activities of daily life in a mindful fashion each week, including mindful communication and mindful eating; these were called *informal practices*. Each MBSR class session had four components: (a) learning and practicing formal meditations; (b) learning and reinforcing informal practices; (c) inquiring into one's present moment experience in domains of physical, emotional, and cognitive experience, while observing those experiences nonjudgmentally (mindful inquiry); and (d) discussion of the previous week's lessons and home practice experiences (integration). Home practice had three components each week: (a) formal meditations; (b) informal practices; and (c) reading the companion text *Full Catastrophe Living* (Kabat-Zinn, 1990), which provides an articulation of the concept and practice of mindfulness. Participants were asked to practice at home 20–30 minutes a day, 6 days a week from Week 1 to Week 8 (7 weeks), aided by audio CDs.

Modifications. The classic MBSR intervention was augmented in two ways, both related to the manner in which course content was taught, rather than changes to the content itself. First, to reinforce safety, sensitive attention was given to the language

used to explain and direct class activities. Influenced by DBT and mindfulness-based cognitive therapy (MBCT; Teasdale et al., 2000), this approach encouraged participants to stay present to experience, while ensuring that the choice to go forward or pull back in any meditation or exercise was theirs alone. In this way, participants were encouraged to “titrate” their own meditative experience and related exposure to present-moment experiences. Second, positive growth awareness was reinforced by techniques drawn from the field of positive psychology. These efforts included building on strengths, acknowledging one’s efforts and expressing gratitude for those efforts, encouraging a sense of connection to others in the class, and cultivating compassion for self and others.

Teacher. The class was taught by a highly experienced MBSR teacher, who received her training through the Center for Mindfulness at the University of Massachusetts Medical School, and has been trained in MBCT and DBT. She has been leading MBSR classes for over a decade and has had a personal meditation practice for more than 20 years.

Statistical Considerations and Analysis

A sample size ($n = 27$) was calculated assuming an alpha error of 0.05 and a beta error of 0.20, estimating a 25% reduction in the BDI-II and accounting for a 15% noncompletion rate, using baseline means and standard deviations estimated from the MBSR literature on depressed patients.

Outcomes of depressive, PTSD, and anxiety symptoms, and mindfulness were assessed at baseline, 4, 8, and 24 weeks. Mean symptom scores, and mean change from baseline, were estimated in repeated measures regression analyses as implemented by the Mixed procedure in SAS (SAS Software Version 9.2, Cary, NC, Copyright 2008).

The magnitude of treatment effect was evaluated by Cohen’s d effect size (calculated as $2t/\sqrt{df}$). The effect of treatment on PTSD symptoms was dismantled further by estimating the mean symptom scores by PTSD criteria B, C, and D (reexperiencing, avoidance/numbing, hyperarousal). The effect of the program on prevalence of PTSD was assessed by a chi-square test of the number of participants meeting criteria for PTSD, at the baseline and 8-week assessment, according to the algorithm on the PCL (Blanchard et al., 1996). To avoid the departure of participants influencing this frequency count, we used a dataset in which missing values were imputed as last value carried for this analysis. The association between home practice and psychological outcomes at 8 weeks was assessed. This was evaluated in linear regression models, with change in psychological outcome from baseline to 8 weeks as the dependent variable, and the sum of hours of each specific practice, as well as the sum of all practice time, separately, as the independent variables. Student’s t tests were used to evaluate mean baseline differences among those who left the study and those who completed it. Analyses were carried out on an intent-to-treat basis, with all available participant data included, regardless of compliance to protocol (Rothman & Greenland, 1998). To evaluate the effect of missing data, all models were re-run with imputation as last value carried forward. The results obtained with imputed data were very similar to those with original data, with the direction, magnitude, and statistical significance maintained for all main study outcomes; given this, we elected to use the original data in the final analyses. The exception to this was a frequency count of participants meeting criteria for PTSD, as discussed above.

Results

Figure 1 depicts the CONSORT flowchart (Moher, Schulz, & Altman, 2001). One hundred thirteen potential participants responded to advertisements and flyers and received a telephone screen. Of these, 23 people were not interested after hearing more about the study, and 51 were found to be ineligible because of scheduling issues ($n = 6$), excluded psychiatric conditions ($n = 12$), not being in concurrent psychotherapy ($n = 29$), no history of sexual abuse ($n = 2$), or therapist refusing to provide recommendation ($n = 2$). Thirty-nine potential participants attended the baseline visit, with some found to be ineligible because of excluded psychiatric condition ($n = 3$) or insufficient psychological distress (raw GSI < 0.50) ($n = 9$). Thus, 27 people were eligible and invited to participate. One enrolled participant dropped out of the study before the first MBSR class and did not return for further study assessments. In Week 2, one participant was asked to leave because of an excluded psychological condition not identified at baseline. A participant left the study in Week 2, saying she was too busy with family to do the home practice and feared possible revival of distress relating to her abuse. A fourth participant left the study in Week 5, after securing a new job that did not allow her to attend study sessions. Finally, two participants declined to participate in the 24-week assessment. Thus, numbers of participants and retention rates at the 4-week, 8-week, and 24-week visits were $n = 24$ (89%), $n = 23$ (85%), and $n = 21$ (78%), respectively. That 85% of participants were

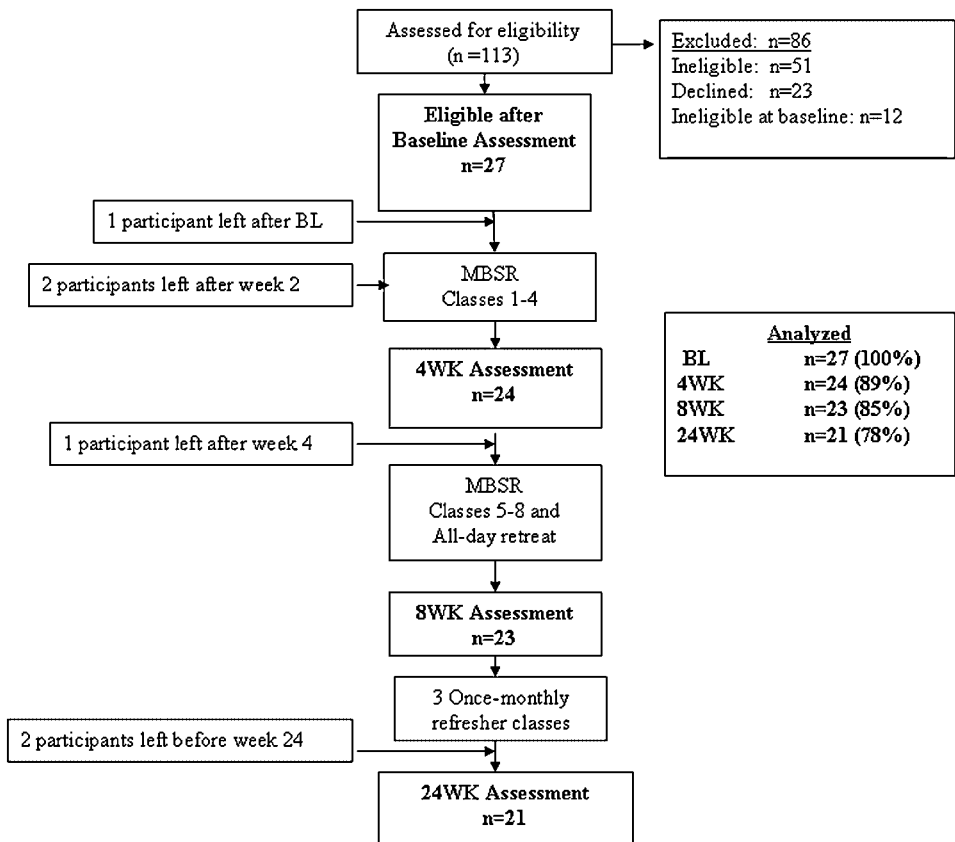


Figure 1. CONSORT diagram, Mindfulness Intervention for Child Abuse Survivors ($n = 27$).

assessed for the main outcome at 8 weeks suggests good retention in the study. There were no significant differences between completers and noncompleters with respect to mean baseline psychological outcomes (data not shown).

There were no study-related adverse events at the moderate or higher level reported at any time.

Sample Characteristics

Baseline demographic and lifestyle characteristics are described in Table 1. Most of the participants were female (89%), white (78%), married or living with partner (52%), had a college degree or higher (59%), and had family incomes below \$50,000 a year (52%). The mean age was 45 (range 23–68). Ten participants (37%) were taking antidepressant medication, two were taking antianxiety medication (7%), and six (22%) were taking both antidepressants and antianxiety medication. Three participants were smokers (11%), and most (93%) reported none or moderate alcohol consumption.

Study Outcomes

Mean depressive, PTSD, anxiety symptoms, and mindfulness scores at the BL, 4-week, 8-week, and 24-week visits are shown in Figure 2. PTSD symptom clusters of criterion B, C, and D are shown in Figure 3.

Depression

At baseline, the mean BDI-II was 22.1 (standard error [SE] = 1.8), suggesting a moderate level of major depression (Beck, Steer, & Brown, 1996). This was reduced

Table 1

Baseline Characteristics Mindfulness Intervention for Child Abuse Survivors (n = 27)

Demographics	Mean	SD
Age	44.9	10.8
	Number	%
Female	24	89
White	21	78
Married or living with partner	14	52
Annual household income <\$50,000	14	52
College degree or higher	16	59
Psychotropic medications		
Antidepressant only	10	37
Antianxiety only	2	7
Both antidepressant and antianxiety	6	22
Lifestyle		
Smoker	3	11
≤7 servings of alcohol in past week	25	93
Baseline psychological measures	Mean	SD
Depression	22.1	9.8
PTSD symptoms	46.8	14.1
Anxiety	1.7	0.9
Mindfulness	3.0	0.9

Note: PTSD = post-traumatic stress disorder.

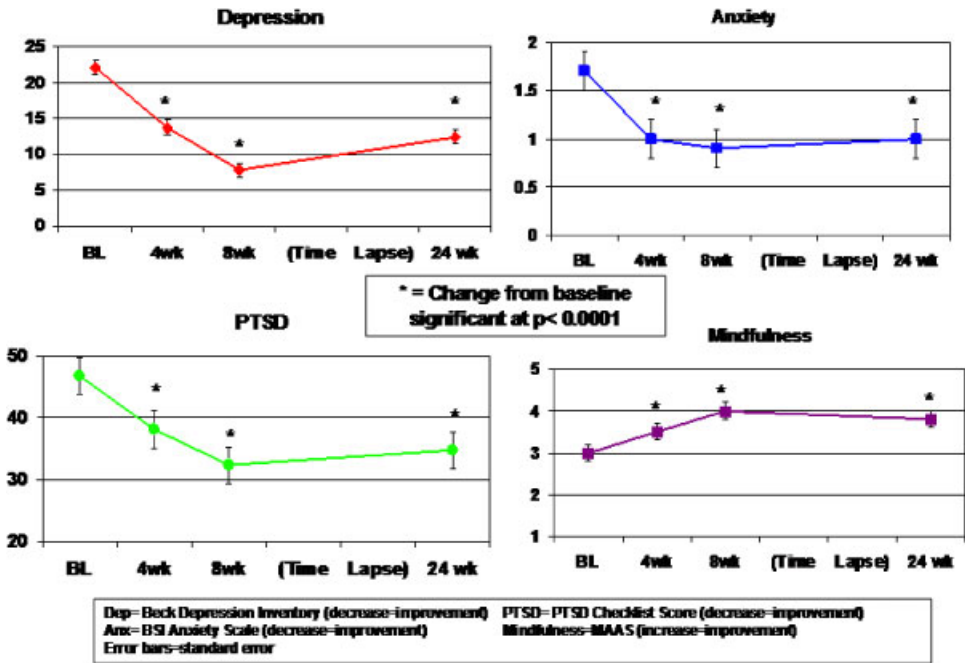


Figure 2. Mean outcome by visit, mindfulness intervention for child abuse survivors ($n = 27$).

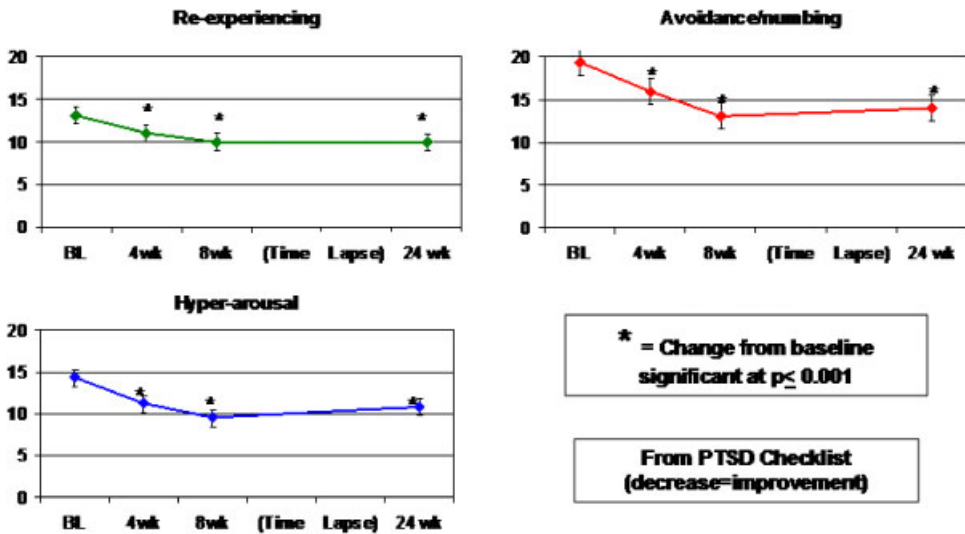


Figure 3. PTSD symptom clusters, mindfulness intervention for child abuse survivors ($n = 27$).

(improved) to 13.7 (1.7) by 4 weeks. At the end of the 8-week intervention, mean depressive symptoms were significantly reduced to 7.8 (1.3), a 65% reduction from baseline. Although mean depressive symptoms at 24 weeks rose to 12.4 (2.2), the improvement from baseline remained statistically significant. The rise in depressive symptoms between 8 weeks and 24 weeks may have clinical implications, suggesting

that a strategy for maintenance of effects is required; this is a problem throughout the behavior change literature. The effect size for depression was 1.8 at 8 weeks and 1.0 at 24 weeks (Depression model $F = 35.7$, $df = 65$, $p < 0.0001$).

Anxiety

The mean anxiety score of 1.7 (0.2) at baseline suggested a high level of distress situated in the 68th percentile of adult nonpatient norms (Derogatis, 1993). At 4 weeks, anxiety decreased (improved) to 1.0 (0.1). By the end of the 8-week intervention, the anxiety score was significantly reduced to 0.9 (0.1), a 47% reduction from baseline. This represents distress at the 61st percentile of nonpatient norms, a drop of 7 percentile points from baseline. The improvement in anxiety was sustained until the 24-week assessment, with mean score 1.0 (0.2). The effect size for anxiety was 1.1 at 8 weeks and 0.9 at 24 weeks (Anxiety model $F = 15.0$, $df = 65$, $p < 0.0001$).

Mindfulness

The mean MAAS at baseline of 3.0 (0.2) represents a score that is lower than has been seen in normative data from community or chronic disease samples or in previous studies (Brown & Ryan, 2003; Carlson & Brown, 2005; Pradhan et al., 2007). By 4 weeks, the mean score improved to 3.5 (0.2). By the end of the 8-week intervention, the mean mindfulness score was significantly improved to 4.0 (0.2), a 33% increase from baseline, representing a level more like that seen in nonpsychiatric community populations (Brown & Ryan, 2003; Carlson & Brown, 2005). By 24 weeks, the mean MAAS score of 3.8 (0.2) reflected little change from 8 weeks. The effect size for mindfulness was 1.2 at 8 weeks and 1.0 at 24 weeks (Mindfulness model $F = 15.0$, $df = 65$, $p < 0.0001$).

PTSD Symptoms

The mean PCL score at baseline was 46.8 (2.7). This level of symptoms is higher than the cutoff PCL score of 44.0, found to have high sensitivity and specificity in predicting PTSD when measured against the Clinician Administered PTSD scale (Blanchard et al., 1996). By 4 weeks, the mean PCL score improved to 38.2 (2.3). By the end of the 8-week intervention, the mean PCL score was significantly improved to 32.3 (1.9), a 31% reduction from baseline. By 24 weeks, the mean rose slightly to 34.7 (3.2), although it remained significantly improved from baseline. The effect size for the PCL was 1.2 at 8 weeks and 0.8 at 24 weeks (PCL model $F = 37.9$, $df = 65$, $p < 0.0001$).

Meeting Criteria for PTSD

At baseline, using the algorithm on the PCL (Blanchard et al., 1996), 15 participants at baseline met criteria for PTSD. Using a dataset with missing values imputed as last value carried forward, this number was reduced to seven participants by the 8-week visit. This represents a 53% reduction in the number of participants meeting criteria for PTSD post-MBSR class ($\chi^2 = 4.91$, $p = 0.03$). By 24 weeks, this number rose to nine participants, with the change from baseline no longer significant (chi-square = 2.70, $p = 0.10$; data not shown).

PTSD Symptom Clusters

Avoidance/numbing symptom score was higher at study start than either the reexperiencing or hyperarousal symptom clusters. From 19.4 (1.0) at baseline, the mean was reduced (improved) to 15.9 (1.1) at 4 weeks. By the end of the 8-week intervention, mean avoidance/numbing was significantly reduced to 13.0 (0.7), or by 33%. At 24 weeks, the mean increased slightly to 14.0 (1.4), while remaining significantly lower than baseline. The effect size for avoidance/numbing was 1.4 at 8 weeks and 0.9 at 24 weeks (Avoidance/numbing model $F = 47.7$, $df = 65$, $p < 0.0001$).

Reexperiencing symptom score was mean 13.1 (1.0) at baseline. This was reduced to 11.0 (0.8) at 4 weeks. By the end of the 8-week intervention, the reexperiencing symptoms score was significantly reduced to mean 10.0 (0.8). This level was maintained at 24 weeks with mean 9.9 (0.9). The effect size for reexperiencing was 0.7 at 8 weeks and 0.7 at 24 weeks (Reexperiencing model $F = 9.7$, $df = 65$, $p < 0.0001$).

Hyperarousal symptom score was mean 14.3 (1.0) at baseline. By 4 weeks, the mean score was reduced to 11.2 (0.8). By the end of the 8-week intervention, mean hyperarousal symptoms were significantly improved to mean 9.5 (0.6). The mean score rose slightly at 24 weeks to 10.8 (1.0), while remaining significantly reduced from baseline. The effect size for hyperarousal was 1.2 at 8 weeks and 0.6 at 24 weeks (Hyperarousal model $F = 22.2$, $df = 65$, $p < 0.0001$).

Class Attendance

Attendance at the nine sessions (eight classes and one full-day retreat) was high. Mean attendance was 7.1 ($SD = 2.5$) classes among all participants, including dropouts. Of those remaining through the 8-week assessment, mean class attendance was 8.1 (1.0) of nine sessions. Of the three refresher sessions offered from Week 9 to Week 24, the mean attendance was 1.6 (1.3).

Home Practice

Participants were asked to practice 20–30 minutes per day, 6 days per week. The time participants reported spending on home practice in total from Weeks 1–8 was 35.7 hours ($SD = 26.6$), or approximately 44 minutes per day, excluding reading time. Participants reported mean 9.3 hours ($SD = 9.0$) for sitting meditation, 3.6 (3.7) for walking meditation, 7.7 (6.0) for body scan, 4.2 (4.2) for gentle yoga, and 10.8 (10.2) for informal practices. There were no significant associations observed between practice time and changes in psychological outcomes.

Discussion

We carried out an open pilot study of mindfulness-based stress reduction to reduce symptoms of depression, PTSD, and anxiety among adult survivors of childhood sexual abuse. Twenty-seven participants were enrolled, of whom 23 (85%) were present for the assessment of the primary outcome of depressive symptoms at 8 weeks, which suggests that retention in MBSR is possible in this patient population. The program was found to be safe and favorably endorsed by participants, according to qualitative data collected and per the high rate of class attendance and home practice.

Statistically significant changes in all outcomes were observed by 8 weeks, remaining significant until the study's conclusion at 24 weeks. Large effect sizes were observed in all outcomes, with the highest being 1.8 for depressive symptoms at 8 weeks. According to Cohen, a medium effect size is meant to represent "an effect

likely to be visible to the naked eye of a careful observer” (Cohen, 1992). This underscores the potentially important clinical relevance of large effect sizes. Symptom levels decreased in all three PTSD symptom criteria of reexperiencing, avoidance/numbing, and hyperarousal. Among these, the effect size seen for avoidance/numbing symptoms of 1.4 at 8 weeks was particularly strong.

There were no significant associations observed between practice time and changes in psychological outcomes in our study. A similar lack of correlation has been observed in some MBSR studies (Astin, 1997; Davidson et al., 2003; Gross et al., 2004; Ramel, Goldin, Carmona, & McQuaid, 2004), while a positive relation has been seen elsewhere (Carmody & Baer, 2008; Shapiro et al., 2003; Speca, Carlson, Goodey, & Angen, 2000). In light of this inconsistency, further research is needed to determine the extent to which home practice of MBSR skills is beneficial in achieving psychological improvement, and for whom. It is possible that for some participants, the class alone is sufficient. In addition, further research is needed to develop more objective measures of adherence, given that self-report is vulnerable to over-estimation of desired behaviors. It is also possible that psychological benefit may result from participant activities not captured in a daily practice log, such as practicing mindfulness throughout the day as challenges arise, responding with compassion to internal judging or coming back to the present moment in a more conscious way. The development of data collection methods to summarize such experiences would improve our understanding.

A limitation of this study was the lack of a randomized control group. As such, it is not possible to say whether these changes occurred as a result of regression to the mean, the Hawthorne effect, or a placebo effect. However, the large effect sizes observed suggest an impact in symptoms beyond that of a placebo response, and the response appears sufficiently hearty to be tested against a control condition in a randomized trial. This should be the next step of research. The sample size in this study was small, thus making changes more susceptible to outliers. Another potential methodological limitation was that participants were under concurrent psychotherapy during the study. Thus, we cannot say whether the MBSR intervention or the psychotherapy was responsible for the changes observed. It must be noted, however, that despite already being in ongoing psychotherapy, in many cases for decades, high levels of depressive and PTSD symptoms were observed at baseline in this sample. This suggests that MBSR applied as an adjunct to psychotherapy may be a useful strategy for these patients.

Specifically, our results suggest that participation in MBSR was significantly associated with reduced depressive symptoms. This finding is consistent with many previous studies of MBSR in varied patient populations (Carlson, Speca, Patel, & Goodey, 2003; Gross et al., 2004; Kabat-Zinn et al., 1992; Miller, Fletcher, & Kabat-Zinn, 1995; Reibel, Greeson, Brainard, & Rosenzweig, 2001; Speca, Carlson, Goodey, & Angen, 2000). Several investigators have speculated on how this might occur. Many suggest that decreased ruminative thinking and improved emotion regulation are mechanisms underlying improvement in depression, and that these occur through a shift toward a nonjudgmental and de-centered view of one's thoughts (Brown, Ryan, & Creswell, 2007; Follette, 2006; Orsillo & Batten, 2005; Shapiro, Carlson, Astin, & Freedman, 2005; Teasdale et al., 2001; Williams et al., 2007). The theoretical framework of mindfulness holds that the continual practice of bringing one's attention to the present moment, and allowing what is in that moment simply to be, eventually leads to a shift in perception in which thoughts and feelings may be observed as arising events. With increased ability to become witness to

thoughts, rather than immersed in their valence and content, there follows increased psychological flexibility, enhanced emotion regulation, and reduced rumination (Brown et al., 2007; Ramel et al., 2004; Shapiro et al., 2005; Teasdale et al., 2001; Teasdale, Segal, & Williams, 1995; Williams et al., 2007).

An interesting observation in this study was that participation in MBSR was associated with reductions in PTSD symptoms, most strongly among them avoidance. Recent thinking in the field of trauma asserts that *avoidance*, the effort to escape or hide from traumatic thoughts, feelings, or memories, is the core psychological process underlying the development and continuation of PTSD (Orsillo & Batten, 2005). Avoidant coping strategies include attempts to suppress intrusive thoughts, to take oneself away from negatively evocative situations, engage in substance use, or through emotional numbing (Follette, 2006). Therapeutic approaches that prescribe the opposite of avoidance, i.e., acceptance, can serve as a form of exposure and work to alleviate avoidant tendencies (Brown et al., 2007; Follette, 2006; Orsillo & Batten, 2005). In offering acceptance of the present moment, MBSR may be such a therapy. The mindfulness approach is that through openness, curiosity, and acceptance of the present moment, one's relationship with negative thoughts is altered (Baer, 2005). By fostering a greater comfort level with thoughts previously avoided, mindfulness practice allows them to surface and, as such, mindfulness may serve as a form of exposure in its impact on PTSD symptoms (Brown et al., 2007; Follette, 2006).

In addition to contributing to a survivor's ability to be present to his or her own painful emotional experience, mindfulness skills also may enhance one's capacity to be present in psychological therapy. In this way, mindfulness may potentiate therapeutic work. The exploration of this synergy should be a topic of future empirical investigation. Thus, MBSR may serve as a widely available, potentially cost-effective way for clients to gain a foundation in mindfulness skills.

To the best of our knowledge, this is the first investigation of the effect of MBSR to reduce negative psychological symptoms of adult survivors of childhood sexual abuse. The study demonstrated that the intervention was feasible, safe, and acceptable in this patient population. Further research is warranted to test the intervention in a randomized, controlled trial.

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