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Shorter communication

Randomized trial of a meditation-based stress reduction program and cognitive behavior therapy in generalized social anxiety disorder

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Abstract

Mindfulness-based stress reduction (MBSR) has been reported to reduce anxiety in a broad range of clinical populations. However, its efficacy in alleviating core symptoms of specific anxiety disorders is not well established. We conducted a randomized trial to evaluate how well MBSR compared to a first-line psychological intervention for social anxiety disorder (SAD). Fifty-three patients with DSM-IV generalized SAD were randomized to an 8-week course of MBSR or 12 weekly sessions of cognitive–behavioral group therapy (CBGT). Although patients in both treatment groups improved, patients receiving CBGT had significantly lower scores on clinician- and patient-rated measures of social anxiety. Response and remission rates were also significantly greater with CBGT. Both interventions were comparable in improving mood, functionality and quality of life. The results confirm that CBGT is the treatment of choice of generalized SAD and suggest that MBSR may have some benefit in the treatment of generalized SAD.

Keywords: Social anxiety disorder; Mindfulness meditation; Mindfulness-based stress reduction; Cognitive behavior therapy

Introduction

Mindfulness meditation or "insight meditation" has been practised for several thousand years in Eastern religions as a method to cultivate inner balance of mind and spiritual growth (Walsh, 1999). It involves non-judgmental, non-reactive, moment-to-moment awareness of mental states and experiences (Kabat-Zinn, 1994). For over 25 years, mindfulness training has been introduced into clinical and non-clinical settings, without its spiritual context, as an intervention to facilitate adaptive coping with life stressors and enhance emotional well-being (Kabat-Zinn et al., 1992). Existing research on mindfulness-based stress reduction (MBSR) has demonstrated that this intervention results in acute and long-term improvement in physical and

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emotional well-being in patients with a broad range of medical disorders and improved ability to manage stress in non-clinical populations (Grossman, Niemann, Schmidt, & Walach, 2004).

While MBSR has been reported to reduce anxiety in medical patients and healthy individuals, little is known about its efficacy in alleviating symptoms of specific anxiety disorders. In a small pilot study by Kabat-Zinn et al. (1992) an 8-week course of group-delivered MBSR produced significant decreases in self-rated anxiety, depression and phobias in medical patients who also met diagnostic criteria for generalized anxiety disorder (GAD) and panic disorder. The drop-out rate was low and compliance with daily meditation practices was good, indicating that MBSR was well accepted and tolerated by patients. Three-year follow-up data revealed that treatment gains were maintained on measures of anxiety, agoraphobia and panic frequency (Miller, Fletcher, & Kabat-Zinn, 1995). Moreover, the majority of patients reported ongoing compliance with meditation practice and believed that the program had lasting value. These preliminary data suggest that a stress reduction program that emphasizes meditative awareness and cultivating acceptance and understanding of difficult emotions and experiences may be an alternative to well-validated diagnostic-specific psychological treatments for anxiety disorders (Miller et al., 1995).

The aim of this study was to evaluate the efficacy of MBSR in generalized social anxiety disorder (SAD), a prevalent and chronic condition characterized by excessive fear of negative evaluation and related avoidance and distress. There are several reasons why MBSR may be beneficial for SAD. First, cognitive models of SAD emphasize the role of self-focused attention on threat-related social cues in increasing anxiety and frequency of self-critical cognitions and impairing performance in social situations (Woody, Chambless, & Glass, 1997). Cognitive–behavioral therapies for SAD have recently incorporated attentional training techniques as a component of treatment to help patients learn to shift their attention from self-focus to external-focus (Rapee & Sanderson, 1998). Mindfulness training can help diminish preoccupation with negative appraisal that fuels anxiety by helping patients learn to distance themselves from self-critical cognitions and intentionally deploy their focus and awareness to the external social situation. Second, mindfulness practices can help diminish distressing physiological symptoms of social anxiety, such as increased heart rate, blushing, trembling and sweating, which allows patients to manage anxiety-provoking social situations more effectively (Miller et al., 1995).

Third, individuals with SAD underutilize mental health services (Magee, Eaton, Wittchen, McGonagle, & Kessler, 1996). This has been attributed to embarrassment about discussing their fears with health professionals resulting in poor detection of the disorder, stigmatizing beliefs about mental illness and beliefs that symptoms are part of one's personality rather than part of a treatable condition (Wagner, Silove, Marnane, & Rouen, 2006). The low rate of help-seeking behavior is a public health concern considering the morbidity and disability associated with SAD (Stein & Kean, 2000). Because MBSR can be taught in non-psychiatric settings by health-care professionals and educators from a broad range of disciplines, it may be an appealing option for individuals who are reluctant to access mental health services. Finally, MBSR could remedy the problem of access to treatment. MBSR can be self-taught with the use of books and audiotapes, making it a highly accessible and inexpensive intervention.

In the present study, we evaluated how well MBSR fared to a gold standard psychological treatment of SAD, cognitive–behavioral group therapy (CBGT), in reducing core symptoms of SAD and improving mood, functionality and quality of life. We expected that both interventions would produce significant and clinically meaningful changes in outcome, but that CBGT, with its use of cognitive and exposure techniques that target fear of negative evaluation and avoidance of feared situations, would produce more improvement on SAD symptoms.

Method

Subjects

The study was approved by the Research Ethics Board of the Royal Ottawa Hospital Health Care Group, Ottawa, Ontario. Patients were recruited via media advertisement and participated in the study after providing written informed consent. Patients were eligible to participate if they had a current diagnosis of DSM-IV SAD, generalized subtype, based on psychiatric interview and a structured clinical interview (Mini International Neuropsychiatric Interview (MINI), Sheehan et al., 1998) and reported at least moderately severe SAD symptoms as determined by a total score $\geqslant 50$ on the clinician-rated Liebowitz Social Anxiety

Scale (LSAS) (Liebowitz, 1987) and a severity rating $\geqslant 4$ on the Clinical Global Impression (CGI)-Severity of Illness subscale (Guy, 1976) at screening and baseline visits. Because comorbidity is common in SAD (Kessler, Chiu, Demler, & Walters, 2005), certain additional current Axis I disorders were allowed as long as they were secondary to and not clinically more prominent than the SAD. In the present study, these included dysthymia, major depression, panic disorder, agoraphobia, GAD, specific phobia and somatization disorder.

Exclusion criteria were a Hamilton Depression Rating Scale (Hamilton, 1960) score $\geqslant 14$ at screen visit; presence of other Axis I disorders; lifetime history of psychotic disorders or bipolar disorder; substance abuse in the past 12 months; current suicide risk; participation in any form of psychotherapy in the last 3 months; received CBT in the past 12 months; participated in any formal stress reduction program that includes regular meditation and yoga practices in the past 12 months; and presence of any clinically significant medical condition that would make it unsafe for the patient to participate in the study. Concurrent use of psychotropics was allowed as long as the medication type and dose remained stable for 6 weeks prior to randomization and throughout the study. Concomitant treatment with any form of psychotherapy was not permitted during the study.

Procedure

Patients underwent an initial telephone pre-screen and were invited for an interview if they were considered suitable for the study. During the screen visit a complete psychiatric and medical history was obtained and patients were administered the MINI. Patients who were eligible for the study at initial screening returned to the research unit approximately 1 week prior to randomization for baseline assessment. Those who continued to meet entry criteria were randomly allocated to one of the two treatment groups. Patients were reassessed at the end of treatment or at early termination.

Treatments

CBGT followed the treatment manual of Heimberg and Becker (2002) and was delivered by an experienced CBT therapist for anxiety (DK). Patients attended a one-to-one treatment orientation interview with the therapist and 12 weekly $2\frac{1}{2}$ h group sessions (total 30 h of treatment). Treatment included psychoeducation about anxiety and the cognitive model of SAD, cognitive restructuring and in-session simulated social exposures. Patients were also assigned between-session homework that focused on cognitive restructuring and exposure to feared social situations. Each group had a maximum of 6–8 participants. The MBSR program followed the manual developed by Kabat-Zinn and Santorelli (1993) and was delivered by an experienced MBSR instructor (MB) who provides mindfulness training to the public and community health centers in Ottawa. Patients attended an initial one-to-one orientation interview with the instructor, 8 weekly $2\frac{1}{2}$ h group sessions and an all-day meditation retreat (total 27.5 h of treatment). The program included psychoeducation about stress and meditation techniques such as the body scan, mindful yoga and sitting meditation. Participants were required to practice formal meditation techniques for 30 min a day using audiotapes for guidance. In weeks 2– 4 they were asked to practice an additional 10–15 min of sitting meditation without the audiotapes. Reading material was provided from a variety of sources on aspects of mindfulness practice. Each group had a maximum of 12 participants.

All sessions were videotaped and a random sample of tapes were reviewed to assess fidelity to the treatment protocols. Homework forms for monitoring daily meditation practices were completed each week by patients in the MBSR group. Assigned homework for patients in the CBGT group was reviewed each week by the therapist and included a review of records of automatic thoughts, cognitive restructuring and exposure to feared social situations. Concomitant treatment with psychoactive substances and other forms of psychotherapy was assessed at each session.

Measures

Clinician-administered instruments

The MINI (Sheehan et al., 1998) was used to confirm the diagnosis of SAD and was administered by a senior research psychiatrist or psychologist with extensive experience conducting structured clinical interviews.

The MINI assesses 17 DSM-IV Axis I disorders and is a well-validated instrument with good inter-rater and test–retest reliability ($\kappa = .94$ and .65, respectively, for social phobia). The MINI also has good diagnostic concordance with other standard diagnostic instruments including the Structured Clinical Interview for DSM (SCID) and the Composite International Diagnostic Interview (CIDI).

Clinician-rated symptom scales were administered by the study psychiatrists who were blind to treatment allocation. Specific instructions were given to research participants for assuring blindness of raters throughout the study. The LSAS (Liebowitz, 1987), a 24-item semi-structured interview, was used to evaluate fear and avoidance of a broad range of performance and social situations. The scale is widely used in treatment outcome studies of SAD and has good psychometric properties including good reliability and convergent validity (Heimberg et al., 1999). The scale provides separate scores for fear (LSAS-Fear) and avoidance (LSAS-Avoidance). The CGI (Guy, 1976) scale rates severity of illness, change over time and response to treatment. It consists of global subscales that measure severity of illness (CGI-S) and improvement (CGI-I). The CGI is a widely used outcome measure in clinical research and is a sensitive index of treatment response.

Patient-rated instruments

The Social Interaction Scale (SIAS) and Social Phobia Scale (SPS) (Mattick & Clarke, 1988) are two 20-item scales that assess two distinct types of social fears: fear of interacting with others and fear of being observed and scrutinized by others. These scales are reliable and valid measures that have been shown to be sensitive to the effects of cognitive–behavioral treatments. The Interpersonal Sensitivity Measure (IPSM) (Boyce & Parker 1989) is a 36-item scale that assesses sensitivity to interpersonal behavior of others, social feedback and perceived or actual negative appraisal by others. The scale has been shown to have good psychometric properties and is a valid and reliable instrument for the assessment of SAD. The Beck Depression Inventory (BDI-II) (Beck & Steer, 1996) is a 21-item measure developed to determine the severity of a variety of depressive symptoms over a 2-week period. The scale is widely used in treatment studies to monitor outcome and its psychometric adequacy is well established. The Liebowitz Self-Rated Disability Scale (LSRDS) (Schneier et al., 1994) is an 11-item scale that assesses current (i.e. past 2 weeks) and most severe lifetime disability attributable to emotional problems. The instrument measures 11 domains of functioning such as education, career, family and romantic relationships, and friendships. The scale has been shown to have adequate psychometric properties. The present study used the current impairment subscale. The Quality of Life Inventory (QoLI) (Frisch, 1994) is a 32-item questionnaire developed for use in clinical populations that measures satisfaction with 16 domains of life such as health, work and friendship. The scale has good reliability and validity and substantial convergent validity and is sensitive to treatment-related changes in clinical samples (Frisch et al., 2005).

Statistical approach

The data were analyzed with SPSS Version 13.0. Two sets of analyses were conducted: one for all randomized patients including those who did not start treatment and drop-outs (intent-to-treat (ITT) sample) and the other for the sample of patients who completed treatment and who attended at least 80% of sessions (completer sample). For patients with missing data ($n = 5$), the expectation-maximization (EM) method was used to impute missing values. The EM algorithm is an iterative estimation procedure that yields more reliable and unbiased estimates compared to other imputation techniques such as simple regression techniques, mean substitution and the last-observation carried forward (Graham, Hofer, & Piccinin, 1994; Schafer & Graham, 2002).

Primary outcomes were the LSAS fear and avoidance subscales, CGI-S, SIAS and SPS. Secondary outcomes were the IPSM, BDI-II, LSRDS-Current, QoLI and response and remission rates. Following Davidson and colleagues (2004), response was defined as scoring 2 or less (improved or very much improved) on the CGI-I scale. Remission was defined as scoring 2 or less (normal or borderline ill) on the CGI-S subscale. Efficacy was analyzed with analysis of covariance (ANCOVA), with baseline scores on the respective measure used as covariates. χ^2 Test and Fisher's exact test were used to analyze categorical measures. Cohen's index d (Cohen, 1988) was calculated to assess effect sizes (ES) for between-treatment comparisons of posttreatment outcomes (mean CBGT–mean MBSR/pooled SD). ES were also calculated for each treatment

condition to evaluate the magnitude of pre- to post-treatment change (pre–post mean/pooled SD). According to Cohen (1988), an ES of .20 is small, .50 medium and .80 large. Significance was set at $p < .05$, two-tailed tests.

Results

Subject characteristics

Sixty-eight participants were evaluated, of which 58 met study criteria at screen visit. Four participants withdrew from the study prior to baseline visit. One participant who completed baseline assessment withdrew prior to the randomization. The ITT sample included 27 CBGT (12 women and 15 men; mean age = 37.6 years, SD = 11.1) and 26 MBSR (16 women and 10 men; mean age = 38.9 years, SD = 15.7) patients. Mean age of onset of SAD was 14.7 years (SD = 6.6) for CBGT and 18.5 years (SD = 21.9) for MBSR patients. Five CBGT (18.5%) and five MBSR (19.2%) patients had a concurrent psychiatric disorder. Seven patients had one and three patients had two comorbid disorders. Dysthymia was diagnosed in four patients ($n = 3$ CBGT; $n = 1$ MBRS), GAD in six patients ($n = 2$ CBGT; $n = 4$ MBSR) and major depression in three patients ($n = 1$ CBGT; $n = 2$ MBSR). Seven CBGT (25.9%) and eight MBSR (30.8%) patients were taking psychotropic medications during the study. There was no significant difference between treatment groups in age, gender, age at onset of SAD, comorbidity or use of psychotropics.

Attrition

One patient randomized to CBGT did not start treatment. Of the 52 patients who started treatment, 12 (23.1%) terminated prematurely: 4 (2 CBGT and 2 MBSR) attended 25% of sessions, 6 (4 CBGT and 2 MBSR) attended $\leqslant 50\%$ of sessions, and 2 (both CBGT) attended $\leqslant 70\%$ of sessions. The drop-out rate was comparable for the two treatment groups ($p = .324$, Fisher's exact test). Reasons for early termination included conflict with schedule ($n = 6$ CBGT; $n = 2$ MBSR), physical illness ($n = 1$ CBGT), need for other psychological treatment ($n = 1$ GBGT) and dissatisfaction with treatment ($n = 2$ MBSR). There were no significant differences between drop-outs and those who completed treatment on demographics, clinical characteristics and baseline measures. Among the patients who remained in the study only one failed to attend at least 80% of sessions ($n = 1$ CBGT).

Between-group comparisons

Tables 1 and 2 display mean baseline and post-treatment scores for primary and secondary outcomes and post-treatment ES. Baseline scores were comparable for the two treatments, with the exception that LSAS-Avoidance subscale scores were higher for MBSR patients in the ITT sample ($F = 4.06$, df = 1,53, $p = .049$).

In the ITT analyses, post-treatment scores were significantly lower for CBGT than MBSR for the LSAS-Avoidance subscale ($F = 7.30$, df = 1,53, $p = .009$), CGI-S ($F = 8.56$, df = 1,53, $p = .005$) and SPS ($F = 8.28$, df = 1,53, $p = .006$), with a similar trend noted for the SIAS ($F = 3.81$, df = 1,53, $p = .057$). No treatment effects were detected for the LSAS-Fear subscale ($F = 2.98$, df = 1,53, $p = .09$) or any of the secondary efficacy measures: IPSM ($F = 1.56$, df = 1,53 $p = .28$), BDI-II ($F = .04$, df = 1,53, $p = .85$), LSRDS-Current ($F = 1.54$, df = 1,53, $p = .22$) and QoLI ($F = .03$, df = 1,53, $p = .87$).

In the completer analyses, post-treatment scores were significantly lower for CBGT than MBSR for the LSAS-Avoidance subscale ($F = 6.73$, df = 1,39, $p = .013$), CGI-S ($F = 11.41$, df = 1,39, $p = .002$), SIAS ($F = 4.46$, df = 1,39, $p = .041$) and SPS ($F = 8.64$, df = 1,39, $p = .006$), with a similar trend noted for the LSAS-Fear subscale ($F = 4.07$, df = 1,39, $p = .051$). Analysis of secondary outcomes revealed that IPSM scores were also significantly lower for patients who received CBGT ($F = 4.63$, df = 1,39, $p = .038$). No treatment effects were detected for the LSRDS-Current ($F = 2.21$, df = 1,39, $p = .15$), BDI-II ($F = 2.90$, df = 1,39, $p = .097$) and QoLI ($F = .35$, df = 1,39, $p = .56$).

A significant advantage of CBGT over MBSR was found for response rates for both ITT (66.7% (18/27) vs. 38.5% (10/26), $\chi^2 = 4.28$, df = 1, $p = .04$) and completer (88.9% (16/18) vs. 45.0% (10/22), $\chi^2 = 8.20$, df = 1,

Table 1
Effect of treatment on primary efficacy variables

Variable	Time of assessment	ITT sample				Completer sample			
		CBGT ($n = 27$)	MBSR ($n = 26$)	p	ES	CBGT ($n = 18$)	MBSR ($n = 22$)	p	ES
Liebowitz Social Anxiety Scale-Fear	Baseline	37.3±7.6	40.8±7.9			37.5±7.9	41.1±7.6		
	Endpoint	23.0±9.5	28.9±8.7	.09	.61	20.8±8.7	28.2±9.5	.051	.76
Liebowitz Social Anxiety Scale-Avoidance	Baseline	34.3±8.6	39.1±8.9			35.4±9.9	38.3±9.3		
	Endpoint	17.4±8.3	25.3±9.0	.009	.84	16.2±8.9	24.5±9.8	.013	.82
CGI-Illness severity	Baseline	4.7±.7	5.0±.8			4.8±.7	4.9±.8		
	Endpoint	3.0±1.0	3.9±.8	.005	.81	2.8±1.1	3.8±.9	.002	.92
Social Interaction Scale	Baseline	46.1±8.9	44.6±10.6			46.3±10.0	45.8±10.7		
	Endpoint	30.2±10.8	34.1±14.9	.057	.30	27.9±11.9	34.7±16.0	.041	.47
Social Phobia Scale	Baseline	33.3±13.2	34.0±14.0			34.2±13.6	34.2±14.7		
	Endpoint	15.4±8.0	24.6±16.4	.006	.68	13.2±6.3	24.0±16.8	.006	.77

Values are mean±standard deviation. Abbreviations are as follows: ITT, intent-to-treat; CBGT, cognitive–behavioral group therapy; MBSR, mindfulness-based stress reduction; ES, effect size. An ES of .20 is small, .50 medium and .80 large. p-Values $\leqslant .05$ are statistically significant.

Table 2
Effect of treatment on secondary efficacy variables

Variable	Time of assessment	ITT sample				Completer sample			
		CBGT ($n = 27$)	MBSR ($n = 26$)	p	ES	CBGT ($n = 18$)	MBSR ($n = 22$)	p	ES
Interpersonal Sensitivity Measure	Baseline	111.9±13.4	112.0±11.8			108.7±13.3	113.4±10.5		
	Endpoint	98.1±14.6	102.5±16.9	.22	.28	92.4±12.3	104.8±17.1	.038	.76
Liebowitz Self-Rated Disability Scale-Current	Baseline	8.9±5.5	8.4±4.8			8.8±4.5	8.5±5.0		
	Endpoint	4.8±4.9	6.0±5.2	.22	.25	4.1±4.7	6.3±5.6	.10	.42
Beck Depression Inventory	Baseline	15.8±12.0	15.1±10.4			13.9±10.1	14.6±10.1		
	Endpoint	9.0±9.8	9.1±7.5	.85	.01	5.2±5.7	8.6.±7.2	.097	.52
Quality of Life Inventory (T-scores)[a]	Baseline	34.3±13.8	33.3±9.9			34.9±13.8	33.8±10.3		
	Endpoint	39.7±11.0	39.6±13.0	.87	.01	41.2±11.2	38.7±13.5	.56	.20

Values are mean±standard deviation. Abbreviations are as follows: ITT, intent-to-treat; CBGT, cognitive–behavioural group therapy; MBSR, mindfulness-based stress reduction; ES, effect size. An ES of .20 is small, .50 medium and .80 large. p-Values $\leqslant .05$ are statistically significant.

[a]Higher scores indicate better quality of life.

$p = .004$) samples. Remission rate was significantly higher for CBGT than MBSR in the completer sample (44.4% (8/18) vs. 9% (2/22), $p = .025$, Fisher's exact test) and there was a weak trend favoring CBGT in the ITT sample (29.6% (8/27) vs. 7.7% (2/26), $p = .076$, Fisher's exact test).

Within-group effect sizes

Pre- to post-treatment ES for each intervention is shown in Table 3. Participants in both treatments improved significantly on all measures and ES calculations indicated that the magnitude of improvement was

Table 3
Within-group effects sizes for primary and secondary outcomes

Variable	ITT sample		Completer sample	
	CBGT ($n = 27$)	MBSR ($n = 26$)	CBGT ($n = 18$)	MBSR ($n = 22$)
Liebowitz Social Anxiety Scale-Fear	1.66	1.44	2.00	1.48
Liebowitz Social Anxiety Scale-Avoidance	1.99	1.54	2.06	1.40
CGI-Illness severity	1.99	1.39	2.25	1.26
Social Interaction Scale	1.61	.81	1.67	.83
Social Phobia Scale	1.68	.61	2.11	.65
Interpersonal Sensitivity Measure	.99	.66	1.27	.63
Liebowitz Self-Rated Disability Scale-Current	.62	.47	1.11	.41
Beck Depression Inventory	.79	.67	1.30	.69
Quality of Life Inventory (*T*-scores)	.44	.54	.48	.41

Abbreviations are as follows: ITT, intent-to-treat; CBGT, cognitive–behavioural group therapy; MBSR, mindfulness-based stress reduction; ES, effect size. An ES of .20 is small, .50 medium and .80 large.

clinically meaningful. In the ITT and completer samples ES for primary outcomes were large for CBGT and moderate to large for MBSR.

Discussion

This study evaluated how well a stress reduction program based on mindfulness meditation practices compared to a first-line intervention for generalized SAD. We found that both MBSR and CBGT produced clinically meaningful changes on measures of social anxiety, mood, disability and quality of life. Within-group ES for measures of social phobia were large for both interventions and comparable to that reported in other studies of CBT for generalized SAD (Clark et al., 2003; Stangier, Heidenreich, Peitz, Lauterbach, & Clark, 2003). Comparison of the two interventions revealed that endpoint scores on primary efficacy measures were significantly lower with CBGT, with the magnitude of treatment effects ranging from moderate to large for the completer sample. CBGT-treated patients reported greater reductions in self-reported fear of interacting with others and being observed and scrutinized and greater reductions in clinician-rated avoidance of social phobic situations and illness severity than MBSR-treated patients. Analysis of secondary outcomes indicated that both interventions were equivalent in decreasing self-rated depression, disability and improving quality of life. Thus, while MBSR did not fare as well as CBGT in decreasing SAD symptoms, it was equally efficacious in improving functioning, mood and subjective well-being.

Response and remission rates were also significantly greater with CBGT than MBSR, with the response rate for CBGT being comparable to other published trials of cognitive–behavioral interventions for SAD (Davidson et al., 2004; Heimberg et al., 1998). Our remission rate with CBGT was modest for the completer sample (44%), and consistent with previous studies (Davidson et al., 2004; Gelernter et al., 1991; Mattick & Peters, 1988), a substantial number of our patients were symptomatic at endpoint. This suggests that 12 weeks of CBGT is not sufficient for most patients to achieve full remission. Similarly, while the 8-week course of MBSR produced robust improvements in social anxiety symptoms, less than 10% of patients met study criteria for remission. Severity and chronicity of illness may be one factor associated with the overall low remission rate in this study. Our patients had a long-standing history of social anxiety and the majority were markedly or severely ill at baseline (i.e. CGI-S$\geqslant$5). Post hoc exploratory analysis of treatment completers showed that 28.7% (6/14) of patients with a moderately severe illness at baseline recovered compared to 15.4% (4/26) of patients who were markedly or severely ill. However, consistent with previous studies the presence of an additional psychiatric disorder did not impact on treatment outcome (Erwin, Heimberg, Juster, & Mindlin, 2002; Turner, Beidel, Wolff, Spaulding, & Jacob, 1996). On the whole, our data suggest that longer-term psychological interventions or a combination of pharmacotherapy and psychotherapy might be necessary for patients with more severe symptoms of SAD.

The MBSR program was well accepted and tolerated by patients and our drop-out rate of 15.3% is only slightly higher than the 8% rate reported in Kabat-Zinn et al.'s (1992) study of panic and GAD patients. Most of our patients reported that daily meditation practices were challenging; however, self-report compliance with practices during the trial was good and patients seemed committed to integrating mindfulness practice into their daily lives. Unlike the CBT therapist, the MBSR instructor was not a mental health professional and had no previous experience working with SAD patients. While it is possible that MBSR might have produced better results had it been delivered by an instructor with experience working with anxiety disorder patients, our finding that MBSR delivered by a lay person produced robust changes in clinician- and patient-rated measures of social anxiety is particularly notable. This suggests that MBSR may be an alternative psychosocial intervention for SAD that can be delivered by qualified instructors from a variety of professional backgrounds in a variety of settings. This could potentially help facilitate help-seeking behavior and also reduce barriers to treatment access.

It would be of interest to evaluate whether integrating mindfulness meditation with CBGT for SAD yields a better outcome than standard CBGT. Recently, mindfulness techniques have been incorporated into well-established psychological treatments, including dialectical behavior therapy for borderline personality disorder (Linehan, 1993) and mindfulness-based cognitive therapy for relapse prevention of depression (Teasdale et al., 2000). Research on these integrated therapies is still in its infancy, but preliminary results indicate that they are more effective than their respective control condition (Lau & McMain, 2005). We are unaware of any randomized trials that have directly compared these integrated treatments with traditional cognitive–behavioral approaches. Thus, the specific advantage of mindfulness training vs. no mindfulness training in these therapies is unknown.

The present study has several limitations. First, we did not use a control comparison and therefore cannot rule out the possibility of spontaneous improvement or impact of non-specific factors such as clinical attention and expectancy effects. Second, assessments were performed at baseline and endpoint rather than weekly and this limited our ability to assess the time course of treatment effects. Third, our patients were recruited primarily via media advertisement and they may not be representative of treatment seeking or clinically referred populations. Fourth, although post hoc exploratory analysis failed to detect an effect of psychiatric comorbidity on treatment outcome conclusions are limited given the relatively low rate of comorbidity and the limited number of specific concurrent disorders. Finally, we used self-report to verify compliance with daily meditative practices and CBT homework and it is possible that some participants over-reported compliance with home assignments.

To conclude, this study showed that while MBSR was comparable to CBGT in improving mood, disability and quality of life, it was less effective than CBGT in reducing core symptoms of SAD. Nevertheless, considering the 45% response rate among treatment completers and positive impact on functionality and quality of life, MBSR may be a potentially useful alternative intervention for some patients with SAD. Further research is needed to replicate these findings with a larger sample of patients and also to explore whether integrating mindfulness with CBGT yields a better outcome than standard CBGT.

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