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Research Report

Generalized Anxiety Disorder Symptom Improvement Following Mindfulness-Based Stress Reduction in a General Hospital Setting

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Abstract.
Background: GAD symptom complaints are common in general medical settings, yet psychosocial intervention options provided within such settings are limited. Randomized controlled trials have found that MBSR is effective for symptom reduction, but such research typically delivered MBSR to small diagnostically homogeneous patient groups rather than to larger heterogeneous groups as provided in medical settings.
Objective: The current research examined what proportion of patients already enrolled in a general hospital MBSR program presented with symptoms of GAD and whether such symptoms reduced after delivering MBSR in large diagnostically heterogeneous groups.
Methods: Twenty-six (40%) of 65 participants enrolled in a large hospital MBSR program indicated moderate to severe GAD symptom severity at the first MBSR session. Of these, 19 voluntarily completed brief self-report measures at the beginning and end of their MBSR course.
Results: Statistically significant reductions pre to post-MBSR were found on the GAD-7 (Cohen's $d = 1.95$), Penn State Worry Questionnaire (Cohen's $d = 0.76$) and the DASS21 Anxiety (Cohen's $d = 0.71$) and Stress (Cohen's $d = 1.31$) scales. Fifteen (79%) GAD participants scored below the GAD-7 screening measure cutoff at the final MBSR session. Forty-seven percent showed clinically significant improvement on PSWQ scores.
Conclusions: MBSR, as typically delivered in general hospital settings, may provide an acceptable and effective treatment option for GAD patients seeking care in medical settings.

Keywords: Anxiety disorders, anxiety, mindfulness, hospital

INTRODUCTION

Generalized Anxiety Disorder (GAD) is highly prevalent in primary care medical settings, often associated with disability, functional impairment, and increased health care utilization [1, 2]. Costs associated with GAD further increase with common medical and psychiatric comorbidities such as pain and/or depression [3]. Although patients suffering from GAD symptoms commonly present in general medical settings, recognition of GAD in such settings is poor and several barriers to specialty

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care exist [1]. Fortunately, cross-diagnostic intervention approaches such as Mindfulness-Based Stress Reduction (MBSR) are becoming increasingly available within the general hospital setting, simultaneously addressing comorbid complaints of chronic pain, insomnia, depression, and other anxiety disorders in addition to GAD symptoms.

Jon Kabat-Zinn developed Mindfulness-Based Stress Reduction (MBSR) at the University of Massachusetts (UMass) Medical School in 1979 for medical patients coping with the stress of chronic pain and illness or with stress-related physical symptoms. This eight-week program began as a hospital-based public health education course, in which MBSR instructors taught formal mindfulness meditation and yoga practices and assigned informal daily life practices according to a rigorous 30-hour curriculum. Although intensive, MBSR programs offered several practical advantages over traditional behavioral health and psychiatric treatment approaches: MBSR instructors without specialized mental health professional backgrounds could serve large groups of 20 to 40 diagnostically heterogeneous patients in one 8-week MBSR course cycle. As early outcome research demonstrated its effectiveness, particularly for the management of chronic pain [4, 5], subsequent randomized control trials established the efficacy of MBSR for chronic pain and other chronic medical diseases [6, 7]. MBSR effectively improved symptoms of anxiety and depression across various medical and psychiatric conditions, as evidenced by meta-analysis research consistently reporting medium effect sizes [7–9]. MBSR now appears as an intervention evaluated in comparative effectiveness research studies in the Substance and Mental Health Services Administration (SAMHSA) National Registry of Evidence-based Programs and Practices (NREPP).

MBSR might serve as an effective adjunct to traditional outpatient psychiatric services. Biegel and colleagues [10] randomized 102 adolescents with heterogeneous psychiatric diagnoses who were receiving standard psychiatric care in an outpatient setting to receive treatment as usual and MBSR or only treatment as usual. Psychiatric outpatients who received MBSR exhibited reduced symptoms of anxiety, depression, somatic distress, and sleep disturbance significantly more than the treatment-as-usual only control group receiving only standard of care medication and/or other mental health treatment. When MBSR was provided to psychiatric patients with past or current mood disorder diagnoses, patients reported decreased depression symptoms, trait anxiety, depressive beliefs (dysfunctional attitudes), and rumination following MBSR when compared to a non-randomized matched waitlist control group [11]. MBSR also appears a promising treatment alternative for anxiety disorder patients, with randomized control trials establishing efficacy for Social Anxiety Disorder [12] and for trans-diagnostic anxiety, depression, and insomnia symptom reduction among patients diagnosed with any one or a mixture of Generalized Anxiety Disorder, Panic Disorder, and Social Anxiety Disorder [13]. Hoge et al. [14] conducted a randomized controlled trial delivering MBSR or an active stress management control intervention to patients diagnosed as GAD with structured clinical interviews. GAD patients randomized to MBSR exhibited comparable reductions in Hamilton Anxiety Scale symptom ratings compared to the active control group post-intervention, yet MBSR led to greater improvements on clinical severity and improvement clinician ratings and self-reported anxiety than the active control group. MBSR also was associated with greater reductions in subjective anxiety and distress and increased positive self-statements in response to a laboratory social stress challenge task when compared to the active stress management control group. Results from this study suggested that the documented clinical benefits of MBSR for GAD symptoms are not merely attention placebo effects and cannot be attributed solely to the general effects of standard stress management education. Thus, hospital-based MBSR programs may offer a desirable adjunctive or alternative treatment option for GAD patients presenting in medical settings.

Although MBSR appears promising for GAD patients presenting in the medical setting context, little research has examined whether GAD patients actually seek out and benefit from such MBSR programs when available. MBSR programs established in general hospital facilities typically serve a wide range of medical patients and do not target GAD as a specific clinical indication. Thus, patients suffering from GAD and their medical providers alike may not recognize such MBSR programs as a viable alternative or addition to specialty psychiatric care. Furthermore, randomized control trials conducted within the research context usually delivered MBSR to small and diagnostically homogeneous groups rather than to larger groups of hospital patients receiving MBSR for a myriad of reasons. The lack of such naturalistic setting research leaves uncertainty

as to whether the MBSR-related GAD symptom reduction observed in controlled research generalizes to the medical setting context. In one notable exception, patients attending the original UMass Medical School MBSR program were screened for DSM-III-R diagnoses of GAD and/or panic disorder with a structured clinical interview [15]. Patients who screened positive for either or both anxiety disorders before MBSR reported significant reductions on anxiety measures designed for the general population (e.g., SCL-90-R) and on acute anxiety measures common to panic disorder research (e.g., Beck Anxiety Inventory, Fear Survey Schedule, Mobility Inventory for Agoraphobia) following the MBSR intervention. Importantly, follow-up research conducted with these same patients documented maintenance of observed improvement three years later [16]. Although GAD individuals were included, outcome measures designed to target symptoms that specifically characterize GAD, such as excessive and uncontrollable worry, were not used. It therefore has not been established whether MBSR directly impacts this key cognitive process central to the development and maintenance of GAD symptoms outside the controlled research context. MBSR emphasizes training in non-judgmental and present-centered awareness, which could counteract reactive mental loops of worry and/or rumination. Within the theoretical context of Metacognitive Therapy for GAD (MCT) [17], mindfulness meditation practice may serve to facilitate meta-cognitive capacity: over the course of meditation practice, individuals might identify underlying meta-cognitive negative beliefs that worry is dangerous while learning to relate to such erroneous beliefs as mere unreliable mental phenomena. The purpose of the current investigation therefore was twofold. First, MBSR participants enrolled in a large, established hospital MBSR program completed self-report measures of GAD specific symptoms and worry at the beginning of the MBSR course to reveal what proportion of patients seeking MBSR in this setting also presented with symptoms of GAD. Second, to examine whether such symptoms and worry reduced following MBSR, these MBSR patients were invited to repeat these measures during the final MBSR session. Importantly, a widely used standardized measure of worry was added to symptom measures to assess excessive and uncontrollable worry directly. This research design compliments previous controlled outcome investigations conducted in artificial research settings by examining whether clinically severe GAD symptoms and worry, if present at the outset, improve following MBSR when delivered in its original naturalistic context.

MATERIALS AND METHODS

Participants and procedure

All procedures were in accordance with the ethical standards of the applicable institutional review board committees that approved protocol review exemptions, and with the 1964 Helsinki declaration and its later amendments or comparable ethical standards. Individuals enrolled in an established MBSR program for outpatients at a large general hospital in the Silicon Valley area of northern California were invited to participate in the current research. Some participants were self-referred to the MBSR program, whereas others were referred by medical providers or psychotherapists for a range of conditions including chronic pain, social anxiety disorder, occupational stress, and various other medical and psychological conditions. After enrollment into the MBSR program, patients attending the first MBSR session were invited to participate in this research by completing three brief survey questionnaires and five demographic and medical questions in addition to the standard paperwork required for MBSR course attendance. A total of 65 MBSR participants volunteered to complete the additional research measures during the first session. Forty (61.5%) of these participants were female, 25 (38.5%) were male, and age ranged from 23 to 72 years ($M = 46.35$, $SD = 12.74$). A large majority identified as Caucasian or White (54 participants, 83%), seven participants (11%) identified as Asian, and the remaining four participants identified as Indian, Iranian, Persian, or "other" racial or ethnic background. No participants identified as African American or Black, Pacific Islander, Hispanic or Latin American or Latino/Latina, or Native American or Alaskan Native. Twenty-two participants (34%) endorsed currently taking medication for anxiety, depression, or any other emotional difficulties, and the remaining 43 participants (66%) denied taking such medication. Thirty-two participants (49%) endorsed currently receiving any type of therapy or counseling for anxiety, depression, or any other emotional difficulties, and the remaining 33 participants (51%) denied currently receiving such services.

The director of the MBSR program, an experienced senior MBSR instructor certified to teach MBSR

and authorized to provide professional MBSR education by the Oasis Institute for Mindfulness-Based Professional Education at the UMass Center for Mindfulness in Medicine, Health Care, and Society, provided MBSR sessions according to the standard Center for Mindfulness MBSR curriculum. During the final MBSR session seven weeks later, 43 of the original 65 participants completed the research measures again. Of this subsample, 24 (56%) were female and 19 (44%) were male, and the age range remained between 23 and 72 ($M = 44.93$, $SD = 13.26$). Reported racial/ethnic background was Caucasian or White for 37 participants (86%), Asian for five participants (12%), and Indian for one participant (2%). Twelve (28%) of these 43 participants endorsed medication and 21 (49%) endorsed therapy or counseling at the first MBSR session.

Measures

Depression Anxiety Stress Scales 21-item version (DASS21) [18]

The fourteen items comprising the Anxiety and Stress scales of the DASS21 were included. The DASS21 is a widely used measure asessing core symptoms of depression, anxiety and stress-related tension. Respondents indicate how much each statement applies to them on a Likert scale ranging from zero to three, resulting in a separate score for each subscale. Good internal consistency, two-week temporal stability, and valid factor structure was demonstrated in clinical samples for all three scales [19].

Generalized Anxiety Disorder 7 (GAD-7) [20]

The GAD-7 is a brief self-report measure of GAD symptoms designed to screen for probable GAD in primary care medical settings. Respondents rate how often they experienced specific GAD symptoms of over the last two weeks on a 0–3 point Likert scale, followed by a rating of how difficult these symptoms made it for them to do daily activities. The sum of the first seven items yields a total score ranging from zero to 21. Evidence of excellent internal consistency, good test-retest reliability, and validity was demonstrated for this seven-item measure, and an optimal cut point of 10 correctly classified patients diagnosed as GAD 89% of the time and correctly excluded patients without GAD in 82% of cases [20].

Penn State Worry Questionnaire (PSWQ) [21]

The PSWQ is a widely used 16-item measure of trait worry with excellent internal consistency, good test-retest reliability, and demonstrated construct validity [21]. Respondents rate each item, including five reverse-scored items, on a five-point Likert scale. Total scores range from 16 to 80 with higher scores indicating a greater tendency to experience excessive and uncontrollable worry.

RESULTS

Preliminary analyses establishing MBSR effectiveness

To confirm that worry, anxiety, and stress reduced following MBSR among the full sample, preliminary analyses were conducted with data from all 43 participants who repeated the measures during the last MBSR session. Two-tailed paired samples *t*-tests comparing pre-intervention scores from the first MBSR session to post-intervention scores from the final MBSR session were conducted for each measure. Cohen's *d* effect sizes were calculated for each measure as well. Scores on each measure significantly decreased from the first to final MBSR session across the 43 participants with complete data: GAD-7 scores [$t(42) = 5.60$, $p < 0.0001$, $d = 0.822$], functional impairment item rating [$t(42) = 3.56$, $p < 0.001$, $d = 0.528$], DASS21 Anxiety scale [$t(42) = 2.73$, $p < 0.009$, $d = 0.425$], DASS21 Stress scale [$t(42) = 4.34$, $p < 0.0001$, $d = 0.645$], PSWQ worry measure [$t(42) = 5.40$, $p < 0.0001$, $d = 0.499$]. See Table 1 for means and standard deviations.

Table 1
Means and standard deviations for all participants completing outcome measures during both the first and last MBSR sessions ($n = 43$)

Measure	Session 1 Mean (SD)	Session 8 Mean (SD)
DASS-Anxiety	8.47 (7.72)	5.58 (5.70)
DASS-Stress	17.58 (10.40)	11.77 (7.38)
GAD-7 Severity	8.47 (5.63)	4.51 (3.82)
GAD-7 Impairment	1.00 (.82)	0.60 (0.70)
PSWQ	55.00 (13.56)	48.26 (13.49)

Note. DASS-Anxiety = Depression and Anxiety Stress Scales, 21 item version – Anxiety subscale; DASS-Stress = Depression and Anxiety Stress Scales, 21 item version – Stress subscale; GAD-7 Severity = Generalized Anxiety Disorder 7-item measure severity score; GAD-7 Impairment = Generalized Anxiety Disorder 7-item measure impairment item rating; PSWQ = Penn State Worry Questionnaire.

Table 2
Means and standard deviations from each measure at the first MBSR session for the full sample and for GAD and non-GAD groups separately

Measure	Full sample ($N = 65$) Mean (SD)	GAD group ($n = 26$) Mean (SD)	Non-GAD group ($n = 39$) Mean (SD)
DASS-Anxiety	9.08 (7.71)	13.00 (7.76)	6.46 (6.54)
DASS-Stress	18.03 (10.65)	26.85 (8.18)	12.15 (7.64)
GAD-7 Severity	8.38 (5.75)	14.46 (2.93)	4.33 (2.80)
GAD-7 Impairment	1.08 (.85)	1.77 (0.77)	0.62 (0.54)
PSWQ	53.68 (14.05)	65.00 (10.13)	46.13 (10.91)

Note. DASS-Anxiety = Depression and Anxiety Stress Scales, 21 item version – Anxiety subscale; DASS-Stress = Depression and Anxiety Stress Scales, 21 item version – Stress subscale; GAD-7 Severity = Generalized Anxiety Disorder 7-item measure severity score; GAD-7 Impairment = Generalized Anxiety Disorder 7-item measure impairment item rating; PSWQ = Penn State Worry Questionnaire.

Initial GAD symptom severity

Of the 65 participants completing questionnaire measures during the first MBSR session, 26 (40%) reported either moderate (13 participants) or severe (13 participants) GAD symptom severity, scoring at or above the GAD-7 clinical cutoff score of 10. These 26 GAD participants also reported difficulty doing their work, taking care of things at home, or getting along with other people on the additional GAD-7 functional impairment item ($M = 1.77$, $SD = 0.77$), whereas the remaining participants did not ($M = 0.62$, $SD = 0.54$). Of the remaining 39 participants, 20 (31%) reported mild and 19 (29%) reported minimal GAD severity. Not surprisingly, the 26 GAD participants also reported elevated levels of acute anxious arousal [$t(63) = 3.66$, $p < 0.001$] and stress [$t(63) = 7.38$, $p < 0.0001$] on the DASS21 scales and pathological worry [$t(63) = 7.03$, $p < 0.0001$] on the PSWQ during the first MBSR session when compared to the 39 participants scoring below the GAD-7 cutoff. See Table 2 for means and standard deviations from each measure for the entire sample as a whole as well as for GAD and non-GAD groups separately.

MBSR effectiveness for clinically significant GAD symptoms

Of the 26 participants reporting moderate to severe GAD during the first MBSR session, 19 repeated the assessment measures post-intervention. Of these 19 participants, 15 scored below the GAD-7 cutoff score of 10 at the final MBSR session. More specifically, six of the 19 participants scored in the minimal severity range, nine participants scored in the mild severity range, two scored in the moderate severity range, and two participants scored in the severe range. Pre to post-intervention paired samples *t*-test comparisons including only these 19 participants who reported moderate to severe GAD during the first MBSR session revealed significant reductions on all outcome measures at the final MBSR session: GAD-7 scores [$t(18) = 7.55$, $p < 0.0001$, $d = 1.950$], functional impairment item rating [$t(18) = 4.37$, $p < 0.0001$, $d = 1.036$], DASS21 Anxiety scale [$t(18) = 2.59$, $p < 0.019$, $d = 0.709$], DASS21 Stress scale [$t(18) = 5.06$, $p < 0.0001$, $d = 1.307$], PSWQ worry measure [$t(18) = 4.36$, $p < 0.0001$, $d = 0.764$]. See Table 3 for means and standard deviations. All reported tests of statistical significance were two-tailed.

Table 3
Means and standard deviations for GAD participants completing outcome measures during both the first and last MBSR sessions ($n = 19$)

Measure	Session 1 Mean (SD)	Session 8 Mean (SD)
DASS-Anxiety	13.05 (7.81)	7.79 (7.02)
DASS-Stress	26.00 (8.00)	15.47 (8.11)
GAD-7 Severity	13.84 (2.77)	6.37 (4.66)
GAD-7 Impairment	1.63 (0.68)	0.84 (0.83)
PSWQ	65.00 (11.09)	55.16 (14.46)

Note. DASS-Anxiety = Depression and Anxiety Stress Scales, 21 item version – Anxiety subscale; DASS-Stress = Depression and Anxiety Stress Scales, 21 item version – Stress subscale; GAD-7 Severity = Generalized Anxiety Disorder 7-item measure severity score; GAD-7 Impairment = Generalized Anxiety Disorder 7-item measure impairment item rating; PSWQ = Penn State Worry Questionnaire.

Clinically significant change on the PSWQ and DASS-21 measures also was assessed for this subsample of moderate to severe GAD participants. Specific criteria indicating reliable clinical improvement and recovery on these measures [22] were

applied to determine the proportion of improved and recovered GAD participants at the final MBSR session. For the PSWQ, standardized clinical significance criteria included a reliable change index of 7 and a cutoff point of $\leq$47 as previously calculated on large treatment samples [23]. On the basis of PSWQ scores post-intervention, nine of the 19 participants (47%) exhibited reliable clinical improvement and seven of the 19 participants (37%) met criteria for recovery. Clinical significance criteria for the DASS-21 scales based upon large samples [24] included a reliable change index of 6.96 for the Anxiety scale and 6.23 for the Stress scale. Cutoff scores to determine recovery included 6.31 for the Anxiety scale and 12.42 for the Stress scale. On the basis of DASS-21 Anxiety scale scores post-intervention, five of the 19 participants (26%) exhibited reliable clinical improvement while ten of the 19 participants (53%) met criteria for recovery. For DASS-21 Stress scale scores, 13 of the 19 participants (68%) exhibited reliable clinical improvement while nine of the 19 participants (47%) met criteria for recovery.

DISCUSSION

Results from this survey investigation indicated that 40% of this sample reported moderate to severe GAD symptoms during the first MBSR session, scoring above the GAD-7 cutoff indicating likelihood of GAD diagnosis. It is unclear whether this high GAD rate reflects this particular hospital setting population generally, whether patients and/or providers within this community consider MBSR a desirable intervention approach for GAD, or whether GAD symptoms simply accompanied other comorbid medical or psychiatric conditions for which these patients enrolled in the MBSR program. Consistent with controlled research findings, statistically significant reductions on all measures for the sample as a whole, as well as for those participants reporting moderate to severe GAD at the beginning of the MBSR program, suggest improved acute anxiety, stress, generalized anxiety, and worry symptoms across participants. For the full completer sample, such statistically significant reductions were accompanied by medium effect sizes (Cohen's *d* ranging from 0.425 to 0.822), suggesting that the degree of improvement on these outcome measures was comparable to the effects reported in randomized trials appearing in the larger medical literature [7]. The large effect sizes found for the subsample of participants indicating moderate to severe GAD (Cohen's *d* ranging from 0.709 to 1.950) suggest that MBSR might offer pronounced benefit for those patients seeking MBSR for GAD symptoms.

These reported symptom reductions appear clinically significant as well. Of those 19 participants with GAD at the outset who provided post-intervention data, 15 recovered to the point of scoring in the minimal to mild rage at the end of the MBSR program. Moreover, means on standardized measures of acute anxiety, stress, and worry for these participants were more than one standard deviation above published normative population means during the first MBSR session, yet fell within one standard deviation of nonclinical sample norms during the final MBSR session ([18] for DASS scales; [25] for PSWQ). When specific clinical significance criteria were applied to PSWQ and DASS-21 post-intervention scores, almost half of the moderate to severe GAD participants reported reliable clinical improvement on the PSWQ, and over one third demonstrated recovery on this worry measure. This finding suggests that worry reduction may be an important clinical target when evaluating the clinical effectiveness of MBSR for GAD. Approximately half of the moderate to severe GAD participants also reported recovery on acute anxiety and stress symptom measures, suggesting that clinically significant general symptom reduction beyond that measured by the GAD-7 also occurred.

MBSR therefore may be an effective addition or alternative to specialty psychiatric services in the amelioration of worry, GAD, and related symptoms. Observed PSWQ reductions in the current study suggest that patients may experience reduced excessive and/or uncontrollable worry as a component of GAD related symptom improvement. MBSR may be especially indicated for GAD because of its demonstrated effectiveness with other common comorbid conditions, such as depression, other anxiety disorders, insomnia, and chronic pain [7]. Case studies and preliminary research has documented such trans-diagnostic symptom improvement for GAD individuals following MBSR [26, 13]. The original MBSR protocol has been adapted specifically for the prevention of major depressive disorder relapse, resulting in Mindfulness-Based Cognitive Therapy (MBCT) [27]. Controlled research since demonstrated the efficacy of MBCT for the prevention of depressive relapse (see [27] for a review), and preliminary outcome research also supports MBCT

for the treatment of panic disorder and GAD [28–31]. However, MBCT is a form of specialty mental health care, delivered by a trained mental health professional with specialized training in cognitive-behavior therapy as well as MBCT. GAD patients presenting within the general medical setting are more likely to have access to MBSR programs than to MBCT, and the current investigation suggests that the original MBSR curriculum delivered in this setting also may be indicated for GAD.

Nevertheless, several limitations of the current research warrant consideration. Although naturalistic designs conducted within "real world" clinical contexts maximize external validity, the lack of experimental control provided by randomized control trials prevents concluding that MBSR caused the changes observed in this study. Furthermore, the current design relied on a self-report screening measure to determine GAD diagnosis and severity, and no independent corroboration of diagnostic status was conducted. It is therefore unclear how many participants would have qualified for GAD diagnosis with structured clinical interview procedures and to what degree clinical symptom improvement would have been observed by trained clinical assessors. In addition, due to the lack of inclusion and exclusion criteria, some participants also reported concurrent medication and/or therapy. It therefore cannot be determined whether such additional interventions were responsible for observed improvements among those participants. It was also unclear whether patients receiving concurrent psychotherapy received cognitive-behavioral therapy or similar skills-based therapy versus supportive talk therapy. If patients were learning related skills in concurrent therapy, the specific effects of MBSR might be especially difficult to interpret. Another study limitation involves the lack of post-intervention data from 22 of the original 65 participants. This attrition rate far exceeds the 11% dropout rate of this particular MBSR program, suggesting that some participants simply decided not to complete assessment measures during the final MBSR session. This low rate of post-intervention measure completion also raises concerns that some participants could have experienced adverse effects during the course of MBSR, but such effects were not detected because adverse effects were not monitored in the current study. Regardless of the reason, no means for determining how these participants would have scored on outcome measures at the end of the intervention exist, therefore limiting conclusions that can be drawn. On a related note, longitudinal follow-up data were not collected after the final MBSR session, failing to assess whether these results maintained beyond post-intervention. Given the inherent trade-off between internal and external validity, future carefully controlled research to establish the efficacy of MBSR for GAD as well as additional naturalistic research to examine effectiveness in applied clinical contexts are needed. Finally, although conducted within a naturalistic hospital setting, these results may not generalize to other regions of the country with different cultural and sociodemographic population characteristics. Indeed, the MBSR program evaluated in the current study is located in northern California's Silicon Valley, representing one of the highest cost of living regions in the nation. Certain ethnic minority groups, including African American and Hispanic or Latino individuals, were not represented in the current sample. Although preliminary research suggests that MBSR also may be effective in ethnically diverse, low-income, inner-city clinic settings [32, 33], such research has not examined generalized anxiety symptom prevalence and symptom improvement specifically.

Although MBSR courses in the general hospital setting are provided to large, diagnostically heterogeneous patient groups by instructors without specialized mental health training, such programs might offer a valuable resource to GAD patients presenting in medical settings. The high rate of GAD reported at the beginning of MBSR in this sample suggests that MBSR may be acceptable to many such patients. The reported symptom reduction following MBSR in this investigation supports its effectiveness, at least for those patients who repeated the assessment measures during the final session. Future controlled research establishing the efficacy and effectiveness of MBSR for GAD as well as practical research that examines MBSR patient access and acceptability are needed to advance empirical knowledge in this area further.

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CONFLICT OF INTEREST

The author has no conflict of interest to report.

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