What Do We Really Know About Mindfulness-Based Stress Reduction?

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Objective: Mindfulness-Based Stress Reduction (MBSR) is a clinical program, developed to facilitate adaptation to medical illness, which provides systematic training in mindfulness meditation as a self-regulatory approach to stress reduction and emotion management. There has been widespread and growing use of this approach within medical settings in the last 20 years, and many claims have been made regarding its efficacy. This article will provide a critical evaluation of the available state of knowledge regarding MBSR and suggestions for future research.

Methods: A review of the current literature available within the medical and social sciences was undertaken to provide an evaluation regarding what we know about the construct of mindfulness, the effectiveness of MBSR, and mechanisms of action. Results: There has been a paucity of research and what has been published has been rife with methodological problems. At present, we know very little about the effectiveness of this approach. However, there is some evidence that suggests that it may hold some promise.

Conclusions: The available evidence does not support a strong endorsement of this approach at present. However, serious investigation is warranted and strongly recommended. Key words: Mindfulness-Based Stress Reduction, adaptation, chronic illness, psychiatric illness, review.

Mindfulness–Based Stress Reduction (MBSR) is a clinical program originally developed to facilitate adaptation to medical illness that provides systematic training in mindfulness meditation as a self-regulatory approach to stress reduction and emotion management. Interest in MBSR has grown exponentially since its introduction approximately 20 years ago (1). There are an estimated 240 MBSR programs in North America and Europe with new programs being established each year (2). With the introduction of a residential professional training program in MBSR now offered by the Center for Mindfulness in Medicine, Health Care and Society at the University of Massachusetts Medical Center (3), the use of this approach will likely become even more widespread.

The primary goal of MBSR is to provide patients with training in meditation techniques to foster the quality of “mindfulness.” Mindfulness has been broadly conceptualized as a state in which one is highly aware and focused on the reality of the present moment, accepting and acknowledging it, without getting caught up in thoughts that are about the situation or in emotional reactions to the situation (1, 4). MBSR aims to teach people to approach stressful situations “mindfully” so they may respond to the situation instead of automatically reacting to it.

MBSR is now being used widely to teach patients to self-manage the stress and emotional distress commonly associated with a range of chronic illnesses and as a psychosocial treatment approach to some psychiatric disorders (2, 4). However, the popularity of this approach has grown in the absence of rigorous scientific evaluation. Although there is some preliminary evidence that suggests that MBSR may hold promise as an effective approach with applications in psychosomatic medicine and general psychiatry, there is a lot that we do not know about this treatment modality. This article will provide a comprehensive critical evaluation of MBSR as a relatively new treatment approach.

DESCRIPTION OF THE INTERVENTION

The primary focus of MBSR is on training participants in various meditation techniques that ostensibly result in the development of mindfulness. Although these various mindfulness training techniques differ somewhat in terms of procedures, they share the same goal of teaching participants to become more aware of thoughts and feelings and to change their relationship to them. The meditation techniques are used to develop a perspective on thoughts and feelings so that they are recognized as mental events rather than as aspects of the self or as necessarily accurate reflections of reality (1, 5). With repeated practice, mindfulness allows the participant to develop the ability to calmly
step back from thoughts and feelings during stressful situations, rather than engaging in anxious worry or other negative-thinking patterns that might otherwise escalate a cycle of stress reactivity and contribute to heightened emotional distress.

A description of sitting meditation will illustrate the basic mindfulness training technique. The participant maintains an upright sitting posture, either in a chair or cross-legged on the floor, and attempts to sustain attention to the breath. Whenever attention wanders to inevitable thoughts and emotions as they arise, the participant simply acknowledges and accepts each thought and feeling, then lets go of them as attention is directed back to the breath. This process is repeated each time that attention wanders to thoughts and feelings. As sitting meditation is practiced, there is an emphasis on simply observing and accepting each thought or feeling without making judgments about it, elaborating on its implications, additional meanings, or need for action (1, 5). Thus, sitting meditation aims to teach participants to passively observe thoughts and feelings simply as mental events with no inherent value of their own. Other techniques (eg, body scan, yoga) are taught after the same basic procedure, although with a different object of focus to sustain attention.

MBSR typically consists of 8 to 10 weekly group sessions, with one session being a full day “retreat.” (3) The format is largely skill-based and psychoeducational. There is considerable in-session experience and discussion of the various mindfulness-training techniques. Patients are educated about the psychophysiology of stress and emotions and provided with ways of approaching specific situations using the mindfulness skills. There is a program of homework exercises that largely involves practice of the mindfulness techniques, both formally as a daily meditation practice, and informally as participants bring mindfulness to thoughts, emotions, and behaviors in their daily lives, particularly during times of stress. Participants are provided with audiocassettes that guide them through the mindfulness meditation exercises.

**REVIEW OF OUTCOME STUDIES**

There has been a paucity of controlled studies in clinical populations (6–9) and only a few uncontrolled studies (10–16). Beyond obvious limitations of uncontrolled designs, the research has suffered from methodological problems that seriously limits the kinds of conclusions that can be drawn. These include inappropriate or inadequate use of statistics, the use of unvalidated measures, failure to control for concurrent treatments that might effect the outcome variables, and arbitrary determination of clinical response. All of the published studies to date relevant to the self-management of stress and mood symptoms associated with chronic illness, with comments regarding strengths and limitations, are described in detail in the Appendix. Because major depression and anxiety disorders commonly are associated with chronic illness and often warrant specific treatment as part of the overall psychosocial management of an illness, these studies are presented as well. The order of the review begins with controlled studies, followed by uncontrolled studies. A summary of these studies highlighting the main findings and the conclusions that can be drawn follows.

**Controlled Studies**

Two studies in nonclinical samples have shown that MBSR may be effective in mitigating stress, anxiety, and dysphoria in the general population (8, 9). The strength of these studies is in the use of randomization to groups, and in the case of Shapiro et al. (9), matched randomization for important potential confounding variables (eg, ethnicity). Also, the decision to attempt replication by having the control group participate in an MBSR program after the end of the randomized controlled trial in the latter study provides an additional test of efficacy. These studies are limited however in the use of an inactive control group. Since nonspecific factors, such as therapists’ attention, social support, and positive expectancy can improve outcome (17–19) it is difficult to attribute the changes to the specifics of MBSR. A better design would include an additional active control group (ie, with therapeutic attention, social support, and positive expectancy) in a three-arm trial. Any differences in postintervention scores in favor of MBSR can then be attributed to the specifics of the interventions. These studies also have questionable generalizability to clinical populations.

Only two randomized, controlled trials have been reported in clinical populations. Speca et al. (6) provide the only rigorous test of MBSR in a medical population—a mixed sample of cancer patients. The results are impressive with 65% and 35% reductions in total mood disturbance and stress symptoms, respectively. Also, time spent practicing meditation correlated with reductions in mood disturbance. This provides compelling evidence that the techniques had a therapeutic effect. However, it is not possible to rule out social desirability effects that may have been operative in patients’ reports of mood and stress changes or their reports of treatment compliance. A measure of social desirability should be included in future controlled trials as a control variable. Also, posttreatment
follow-up is needed to fully evaluate the long benefits of this approach.

Teasdale et al. (7) provide the only other randomized controlled trial of an MBSR-based treatment in a clinical sample; recently recovered depressed patients. This rigorously designed study yielded impressive results. MBSR combined with cognitive therapy resulted in half the rate of relapse of depression over a 60-week period for individuals who had three or more previous episodes. If replicated, this combined approach would represent an important prophylactic treatment of recurrent depression. Unfortunately, because a combined treatment modality was used, it is not possible to make strong statements regarding the effectiveness of MBSR per se for the prevention of depressive relapse. Furthermore, its application for the treatment of major depression is yet unknown.

Uncontrolled Studies

The remaining studies are seriously limited by the reliance on uncontrolled repeated measures designs. Although the rigor of this design can be greatly improved with the inclusion of a nontreatment comparison group to control for regression toward the mean, only one study uses this approach (10). Unfortunately, that study did not match participants on potentially important variables that might have otherwise differentiated the groups in a way that would affect outcome. Although the available evidence does not currently support a strong endorsement of this intervention in any of the following clinical populations, some general statements can be made about the available evidence regarding the suggested efficacy of MBSR that awaits rigorous testing via randomized controlled trials.

In chronic pain, there is preliminary evidence that MBSR may assist patients with psychosocial adaptation as evidenced by reductions on self-report measures of emotional distress, psychiatric symptoms, and functional disability (10). More importantly, these gains may remain for up to 4 years posttreatment (11). However, the impact of MBSR on psychosocial adaptation to pain may be more robust than lasting impact on pain symptoms. Although MBSR resulted in some mitigation of pain, it returned to preintervention levels within 6 months after treatment. It is possible that continued regular practice of mindfulness mediation may prove to be an effective long-term strategy for pain management but this remains an empirical question. It is important to note that the majority of the patients who participated in the MBSR program had a long history of medical treatment with little or no improvement in either their pain status or emotional-behavioral status. Despite the methodological limitations of the studies, the fact that these “treatment resistant” patients improved at all is indeed impressive.

In terms of fibromyalgia, the one study published (12) has serious methodological limitations including lack of a comparison group, failure to report descriptive and inferential statistics, and arbitrary determination of clinical response. In terms of the latter, patients were identified as responsive to treatment if they showed at least a 25% improvement on at least half of the measures. There may be significant difficulties with giving each of the measures equal weights in defining clinical significance. Furthermore, using arbitrary criteria regarding clinical response is unnecessary. Clinical improvement can be determined objectively by using established cut-off scores on the measures included in the study. Also, the investigators combine illness symptoms with markers of adaptation when defining clinical response. Since psychosocial interventions frequently facilitate adaptation without impact on illness severity, it is important to consider these separately. While methodological limitations preclude strong statements regarding efficacy, it does seem that MBSR may have been associated with a significant reduction (39%) in severity of psychiatric symptoms.

In generalized anxiety and panic disorder, MBSR was associated with significant reductions in the severity of symptoms from pretreatment to posttreatment with mean reductions to the nonclinical or subclinical range on all clinician-ratings and self-report measures (13). The study used rigorous assessment procedures, including structured clinical interviewing (DSM-III-R criteria) to select eligible patients and established psychometric instruments. Unfortunately, half of patients (55%) were also being treated pharmacologically during the MBSR program. It is unclear if the intervention had any significant therapeutic effect beyond medication. It seems that patients maintained their gains at a 3-year follow-up, but half of the participants had received additional treatment for their anxiety disorder since ending the MBSR program (14).

One study has examined the efficacy of MBSR in binge eating disorder (15). The investigators excluded participants who were concurrently involved in a weight-loss program or psychotherapy, which obviously increases confidence in attributing change in symptoms to the MBSR. However, the lack of a comparison group is a major limitation. Although preliminary, the results suggest that MBSR may be a promising approach to both binge eating symptoms and the anxiety and depression that is frequently associated with binge eating disorder.

Although suffering similar methodological limi-
tions as the other clinical investigations, the study by Roth (16) is important in that it examines the efficacy of MBSR in a sample of patients within a low socioeconomic cohort and includes two samples from different ethnic backgrounds (ie, English-speaking Americans and Spanish-speaking Latin Americans). Unfortunately, differences between groups in terms of treatment response were not examined statistically. Observation of completion rates for the program suggested that they were much lower than previously reported (53% of the English patients and 64% of the Latin American patients). Despite limits, this study highlights the importance of examining level of acceptability and compliance of this intervention approach in different populations.

In summary, there is some preliminary evidence that MBSR may be effective in various medical and psychiatric populations. The evidence is stronger in the efficacy of MBSR as a general stress reduction approach in nonclinical populations than clinical populations. Although replication is needed, MBSR seems to hold promise as a highly effective psychosocial approach for the management of stress and mood disturbance in cancer. The evidence in other medical and psychiatric conditions is less compelling although preliminary evidence supports the argument that MBSR should be evaluated via randomized controlled trials.

**OPERATIONAL DEFINITIONS, VALIDATION, AND MEASUREMENT**

MBSR was adapted from traditional mindfulness meditation practices originating in Theravada and Mahayana Buddhism in India approximately 2500 years ago (20). The construct of “mindfulness,” therefore, has its roots in Buddhism. The Abhidhamma (21) represents a compilation of the Buddhist psychology and philosophy and includes detailed descriptions of states of consciousness said to be attainable through meditative techniques. In the fifth century, the portion of the Abhidhamma that deals with meditation was summarized in a collection known as the Visuddhimagga, or the “path of purification.” (22) Within these texts are descriptions of the qualities of mindfulness that are said to be attained through vipassana, or mindfulness meditation practice. For the most part, modern Western descriptions of the construct in the scientific literature have been consistent with the traditional Buddhist conceptualizations of mindfulness.

Unfortunately, the defining criteria for mindfulness have not been elaborated substantially beyond nonspecific descriptions of the construct. For example, mindfulness has been described as a state in which one is “fully present in the moment, focused on the reality of the situation,” while “acknowledging and accepting it for what it is” (1, 4, 5). There have been no attempts to operationalize these qualities. However, each of the three dimensions emphasized in the literature seems to involve an aspect of attention regulation.

First, this seems to involve maintaining one’s attention to a single point of awareness whereas disengaging from thoughts or feelings about the object being observed or from irrelevant discursive thoughts. This ability is hypothesized to develop during meditation as the individual sustains attention to the breath to “anchor” it to the present moment and repeatedly disengages attention from thoughts and emotions as they inevitably arise. This is said to allow the individual to be “fully present in the moment.” At a behavioral level, maintaining awareness to an object or situation over time would involve sustained attention (23, 24). To disengage from mental activity that might arise and focus back on the object or situation being observed would involve attention-switching (25).

Secondly, to “observe the reality of the present moment” the practitioner attends to the objective qualities of experience or a situation without immediately resorting to an active process of making judgments about it, elaborating on its implications, further meanings, or need for action. This is referred to as “bare attention.” (1) During meditation, thoughts and emotions that spontaneously come into conscious awareness are observed as they are, although the practitioner attempts to inhibit the regular tendency to judge, interpret, or otherwise elaborate on them. This inhibition of elaborative secondary processing would require the ability to control attention to terminate thinking about, or otherwise elaborating on, the primary mental event so that it can be simply observed (26, 27).

Third, the practitioner is said to remain open to experience as all available information is intentionally observed without attachment to any particular point of view or outcome. This is thought to allow the person to “acknowledge and accept the situation for what it is.” In meditation, thoughts and emotions that inevitably arise are simply accepted and observed; there are no attempts to change or escape from anything, nor are there attempts to hold on to or prolong anything. Instead, the practitioner remains open to observing the presence of each thought and emotion that arises, as well as its dissolution. In terms of implicated psychological processes, this seems to involve reliance less on preconceived ideas, beliefs, and biases and more on paying attention to all available information (28).

Mindfulness seems to reflect a kind of meta-cognitive ability (29) in which the participant has the capacity to observe his or her own mental processes. This process of “stepping back” and observing the flow
of consciousness is thought to result in the recognition that each thought and feeling reflects a mental event with no more inherent value or importance other than what the practitioner affords them. There seems to be a shift in perspective from automatically accepting the validity or relevance of each thought, to the suspension of commitment to any one thought or perspective. Thoughts are therefore treated as potentialities pending further evidence. Similarly, affect states are not inherently “pleasant” or “unpleasant” but are merely observed as mental events. This would be expected to improve affect tolerance and decreased reactivity in the presence of emotional states. Situations are approached with the same objective awareness; they consist of the unfolding of events with no inherent value other than what one affords them.

The shift in perspective on one’s own experience seems to be further facilitated by a set of attitudes that are emphasized during MBSR. These attitudes involve a way of attending to experience and are practiced during the various mindfulness meditation techniques and applied more generally to real-life situations (2, 4). Two of the more salient and related attitudes include “nonstriving,” which has been described as a kind of surrendering to the moment, acknowledging and facing one’s experience instead of fighting it or trying to make it something else, and “acceptance” of the situation. Also, the importance of dealing with the immediacy of the current situation, rather than possible futures or the past, is emphasized. The voluntary deployment of attention, in combination with these attitudes, is thought to result in a heightened state of awareness in which one is conscious of a particular situation and one’s cognitive, emotional, and somatic experience in that situation in a way that fosters a greater sense of equanimity. Thus, in addition to attention regulation skills, mindfulness can be conceptualized in terms of a core set of attitudes and a general approach-orientation to experience.

At a conceptual level, mindfulness seems to share a number of features with other psychological constructs. Mindfulness seems to be related to absorption, an individual’s proclivity toward complete attentional involvement in one’s perceptual, imaginative, and ideational experience (30). Both share a number of similar features including an attentional focus on current experience and awareness of available stimuli. Unlike absorption, however, mindfulness does not involve a complete immersion in experience. In mindfulness, the person remains able to observe experience in a detached way, as if somewhat removed from the experience (5). Mindfulness may also be related to the personality trait of openness (31, 32). Both constructs involve a reflective and contemplative approach to situations, open-mindedness, and a tendency toward curious introspection (5, 32). However, unlike openness to experience mindfulness does not involve an effort to seek out novel experience or engage in active imagination. Instead, mindfulness involves directing attention to whatever happens to be within current experience. Mindfulness can also be differentiated from other attentional states such as dissociation, which involves an altered state of awareness that is typically characterized by restricted attention (33). Unlike dissociative states, mindfulness involves an effort to direct attention to all available information.

There is currently no evidence that can be cited in support of the validity of the construct of mindfulness. However, operationalizing the construct does allow for investigators to test the validity. For example, convincing evidence in support of construct validity would be obtained if experience with mindfulness meditation were to produce enhanced performance on cognitive tasks that require sustained attention and attention-switching, termination of elaborative processing, and awareness of stimuli. There are a number of standardized attention vigilance (that require sustained attention) and attention-switching tasks can be adapted from cognitive neuroscience (25, 34). Similarly, the ability to inhibit elaborative processing can be measured with such attention control tasks as the “stop signal paradigm,” which measures the speed that one can disengage from a cognitive operation (26). Attitudes and beliefs thought to be associated with mindfulness can be readily measured with self-report questionnaires. Convergent validity can be established by examining whether scores on the mindfulness measure correlate positively with measures of absorption and openness to experience. Discriminate validity can be established by examining whether scores on the mindfulness measure correlate with measures of dissociation and social desirability; they should not correlated if these constructs are orthogonal. Since mindfulness is theoretically predicted to mitigate stress and mood symptoms, criterion-related validation can be established by testing whether an increase in mindfulness corresponds with decreased scores on measures of stress and mood symptoms.

MECHANISMS OF ACTION AND CLINICAL ISSUES

Questions concerning the operational definitions and validation of the construct of mindfulness are highly relevant to identifying the mechanism of action of this approach. MBSR was developed to assist individuals in mastering meditation techniques and to become skillful in producing a state of mindfulness (1),
the hypothesized primary active component (3, 4). There is no evidence, however, that MBSR actually enhances one’s ability to produce a state of mindfulness. In addition to the substantive significance of this gap in our knowledge, it also raises practical considerations. MBSR is a demanding clinical program, requiring participants to practice meditation for a minimum eight-week course of daily 45-minute sessions, ostensibly to develop the skill of cultivating mindfulness (3). MBSR may merely produce nonspecific benefits, such as increased self-efficacy or social support, common mediators of many group interventions (35–37). If MBSR does not induce mindfulness, or mindfulness is not the primary therapeutic component, then it becomes difficult to justify such a demanding program. Even if mindfulness meditation proves to be a major therapeutic component, it may have nothing to do with “mindfulness;” it may simply produce deep relaxation (38, 39). Research needs to clarify whether mindfulness meditation produces some kind of altered relaxation (38, 39).

Indeed, it is entirely possible that the efficacy of this approach has more to do with the kinds of people who gravitate to the program than the approach itself. This needs to be investigated. Pretreatment levels of emotional distress and/or severity of psychiatric symptoms may influence efficacy as well. For example, severe stress or mood symptoms may impede the development or use of mindfulness to mitigate distress reactions. Also, there needs to be some clarification regarding what types of mood states or psychopathology is responsive to this approach. These questions have important implications for the identification of potential patients who would be expected to benefit from this approach.

**DISCUSSION**

Group-based psychosocial interventions that facilitate adaptation and adjustment to chronic illness are both effective and time-efficient and cost-efficient. Consistent with the recognized goal to improve the quality of life of patients with chronic medical disorders, the integration of group-based psychosocial interventions into standard care is strongly recommended. A psychosocial treatment approach that can effectively assist patients to self-manage their stress and emotional distress, and/or treat mood and anxiety disorders commonly associated with chronic illness, would be highly valued in most treatment settings.

Although MBSR has been presented as such an approach, there is insufficient evidence based on rigorous scientific methods to strongly recommend it at this time. However, there is some preliminary evidence that suggests that this approach should be evaluated. Certainly, with the current and growing popularity, both among the increasing number of health professionals who are using this approach and health consumers who are demanding it, this is enough of a reason alone to subject it to scientific scrutiny. In an era of increased accountability to demonstrate that our psychosocial interventions are indeed safe and effective, the issue regarding the paucity of empirical study is not a minor one.

Although preliminary evidence is promising, controlled studies are clearly needed. Although the efficacy of MBSR to self-manage stress and mood symptoms associated with cancer seems particularly promising, it would be difficult based on a single randomized controlled trial to strongly recommend it at this time. The study is significant however as it represents the first rigorous test of the efficacy of this approach to foster adaptation to a medical illness. Replication is clearly needed to firmly establish its efficacy in this population. Clinicians are cautioned further against generalizing the efficacy of this approach based on this study to other chronic illnesses. The efficacy of MBSR should be investigated in each
illness that it was adapted for until it has been shown that the treatment effects can generalize across illnesses. Finally, clinicians are cautioned against attempting to use this approach as a “cure all” for any problematic mood-state or psychiatric disorder that presents with chronic illness. Substantial clarification regarding the specific markers of psychosocial distress or psychopathology associated with chronic illness that are amenable to this approach is needed.

The next logical step within future randomized controlled trials is to investigate questions concerning the mediating role of mindfulness. However, “mindfulness” needs to be operationalized and its construct validity tested, and a method of assessment needs to be developed, before researchers are able to investigate its mediating role. The current paper has presented an operational definition of the construct in a manner that outlines specific testable hypotheses for its validation. This should allow for the development of a method of measurement that can be included in future controlled studies. A systematic investigation of questions regarding the therapeutic mechanisms of MBSR raised in this paper would then be possible.

It is time to subject this approach to serious scientific inquiry. MBSR seems to hold promise as a potentially effective treatment option that may assist some patients to self-manage stress and mood symptoms in the face of their illness. Scientist-practitioners who see value in the approach are urged to adopt rigorous methods of investigation so that its efficacy, indications, and limits of application within psychosomatic medicine can be clearly established. In the same vein, skeptics are cautioned that absence of evidence does not necessarily indicate absence of efficacy. It is hoped that this review will foster cautious optimism about the potential of this approach and direct investigators toward addressing relevant research questions that will result in an empirical base that can guide clinical practice.

REFERENCES

25. Duncan J. Attention, intelligence, and frontal lobes. In: Gazza-
## APPENDIX

### Review: Mindfulness-Based Stress Reduction

<table>
<thead>
<tr>
<th>Study</th>
<th>Condition</th>
<th>Participants</th>
<th>Design</th>
<th>Measures</th>
<th>Results</th>
<th>Comments</th>
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<tbody>
<tr>
<td>Controlled studies</td>
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<tr>
<td>Speca et al. (6) (2000)</td>
<td>Cancer</td>
<td>90 outpatients</td>
<td>Randomized wait-list control trial; 7-week MBSR program</td>
<td>Profile of Mood States Symptoms of Stress Inventory</td>
<td>Posttest POMS; lower total mood disturbance, anxiety, depression, anger, and confusion and higher vigor scores for the treatment group. Posttest SOSI; fewer overall symptoms of stress. Also presents change scores from pretreatment to posttreatment which showed even greater differences in favor of the treatment group.</td>
<td>Standardized measures and design a strength. Also, examined relation between compliance (attendance and time spent meditating) and outcome; allows for some inferences regarding mediating role of the mindfulness techniques. Change scores can be associated with decreased reliability.</td>
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<tr>
<td>Teasdale et al. (7) (2000)</td>
<td>Major depressive disorder; recurrent</td>
<td>145 recently recovered depressed patients</td>
<td>Randomized controlled trial assessed at 52 weeks following an eight-week program</td>
<td>Blind assessment with the Structured Clinical Interview for DSM-IV (SCID) Hamilton Rating Scale: Depression (HRSD) Beck Depression Inventory (BDI)</td>
<td>For patients with three or more previous episodes, the treatment halved the rate of relapse of depression. For patients with only two previous episodes, no decrease in relapse.</td>
<td>Effects of social desirability as a potential factor that might bias self-report data not controlled. Very well-designed study with high level of rigor. Relevant only to the prevention of relapse; can this be generalized to the treatment of depression?</td>
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<td>Astin (8) (1997)</td>
<td>Non-clinical sample</td>
<td>28 university undergraduates</td>
<td>Randomized wait-list control trial; eight-week MBSR versus control</td>
<td>SCL-90-R Shapiro Control Inventory</td>
<td>MBSR group demonstrated statistically significant lower postintervention scores on the GSI on the SCL-90-R (65% average reduction), as well as subscale scores for depression, anxiety, obsessive-compulsive symptoms, interpersonal sensitivity, psychoticism, and paranoid ideation than participants in the control. Also demonstrated statistically significant greater adaptive changes in overall sense of control, sense of self as source of control, greater capacity to accept or yield control in uncontrollable situations, and satisfaction with level of control.</td>
<td>Combined MBSR with cognitive therapy; how much is mindfulness training vs cognitive therapy? Very well-designed study with high level of rigor. Relevant only to the prevention of relapse; can this be generalized to the treatment of depression? Randomization to groups, standardized measures strengths. Questionable generalizability to clinical populations.</td>
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<td>Shapiro et al. (9) (1998)</td>
<td>Nonclinical sample</td>
<td>70 premedical and 130 medical students</td>
<td>Randomized controlled trial; eight-week MBSR versus waiting-list control</td>
<td>SCL-90-R State-Trait Anxiety Inventory</td>
<td>MBSR group demonstrated statistically significant lower postintervention scores on the SCL-90-R GSI and depression subscale and state anxiety scores than participants in the control. Also demonstrated statistically significantly greater scores on the empathy scale.</td>
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<td>Empathy Construct Rating Scale</td>
<td>Control participants reported statistically significant reductions in GSI and depression subscale scores on the SCL-90-R and lower state anxiety and greater empathy following the MBSR program.</td>
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<td>Participants were matched within randomization for gender, ethnicity, and medical school status (premedical vs. medical student). Study was designed to coincide with students exams (high stress period).</td>
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<td>Uncontrolled studies</td>
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<td>Attemp at replication is strength; lack of comparison to control for regression toward the mean is a limit. Same methodological limitations noted for Astin (8).</td>
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<tr>
<td>Kabat-Zinn et al. (10)</td>
<td>Chronic pain; mostly muscle-skeletal</td>
<td>90 outpatients mostly referred from a pain clinic. Most patients had long history of medical treatment with little change in pain or psychosocial status.</td>
<td>Pre/post repeated measures; participated in ten-week MBSR program</td>
<td>SCL-90-R McGill Pain Questionnaire</td>
<td>There was a 58% statistically significant reduction in pain intensity with 72% of the participants reporting at least a 33.3% reduction in pain and 61% reporting at least a 50% reduction. In terms of functional impairment, there was a 30% statistically significant reduction in the mean. On the POMS, there was a 55% statistically significant reduction in the mean for total mood disturbance. The mean for the SCL-90-R GSI was reduced by 35% with 59% of patients reporting at least a 33.3% reduction and 39% reporting at least a 50% reduction.</td>
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<td>(1985; Study 1)</td>
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<td>Profile of Mood States Questionnaire regarding functional impact</td>
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<td>Standardized measures used except for disability measure, which has no reliability or validity data. No comparison to control for regression toward the mean. Statistics are appropriate but not adequately reported; only the means and probability of significance are provided. Without providing the variance around the means and inferential statistics (t-values, degrees of freedom) it is difficult for the reader to gain a full understanding of the data.</td>
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## APPENDIX (Continued)

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<tr>
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<tr>
<td>Kabat-Zinn et al. (10)</td>
<td>Same as Study 1.</td>
<td>Chronic pain; 21 outpatients participated in a ten-week MBSR program and 21 nonintervention comparison patients</td>
<td>Pre/post repeated measures comparison control; treatment group participated in ten-week MBSR</td>
<td>SCL-90-R McGill Pain Questionnaire Profile of Mood States Questionnaire regarding functional impact</td>
<td>The comparison participants did not report a statistically significant change on any of the measures. Statistically significant reduction in pain intensity; 71% of the MBSR participants reported at least a 33.3% reduction in pain intensity scores and 57% reported a 50% reduction. The reduction in functional disability also was not statistically significant. Statistically significant reductions in SCL-90-R GSI and POMS total mood disturbance scores; 73% reported at least a 33.3% reduction in GSI scores with 40% reporting at least a 50% reduction. 55% change in the mean for the POMS total mood disturbance score.</td>
<td>Inclusion of comparison to control for regression toward the mean. Standardized measures used except for disability measure, which has no reliability or validity data. Comparison unmatched for potential important differences in medical, psychosocial and sociodemographic variables. Baseline scores were not analyzed; examination of the means suggests that the comparison group had 25% more pain and 20% high emotional distress.</td>
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<tr>
<td>Kabat-Zinn et al. (10)</td>
<td>Same as Studies 1 and 2</td>
<td>56 chronic pain patients who had previously completed a ten-week MBSR program</td>
<td>Uncontrolled follow-up; patients contacted from 2.5 to 15 months post-MBSR</td>
<td>SCL-90-R McGill Pain Questionnaire Profile of Mood States Questionnaire regarding functional impact</td>
<td>A statistically significant reduction on all measures (pain, disability and emotional distress) from preintervention to postintervention. Mood disturbance and severity of psychiatric symptoms remained at postintervention levels. Pain intensity returned to preintervention levels.</td>
<td>Standardized measures used except for disability measure, which has no reliability or validity data. No comparison to control for regression toward the mean. Statistics were appropriate by not adequately reported (same comments as for Study 1).</td>
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<td>Kabat-Zinn et al. (11)</td>
<td>Chronic pain; mostly muscle skeletal</td>
<td>225 previous participants in a ten-week MBSR program</td>
<td>Uncontrolled follow-up; patients contacted from 2.5 to 48 months</td>
<td>SCL-90-R McGill Pain Questionnaire Profile of Mood States Questionnaire about functional impact</td>
<td>A statistically significant reduction on all measures from preintervention to postintervention. Follow-up scores on measures of emotional distress, severity of psychiatric symptoms and level of disability were statistically significantly lower than preintervention scores. Follow-up pain returned to preintervention levels.</td>
<td>Standardized measures used except for disability measure, which has no reliability or validity data. No comparison to control for regression toward the mean. Regression is not an appropriate statistical test of postintervention and follow-up scores due to lack of independence of data points; repeated measures analysis of variance would have been more appropriate.</td>
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<td>Study</td>
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<td>Kaplan et al. (12)</td>
<td>Fibromyalgia</td>
<td>77 self-selected patients participated in a ten-week MBSR program</td>
<td>Pre/post repeated measures</td>
<td>SCID interview, SCL-90-R, Coping Strategies Questionnaire, Fibromyalgia Impact Questionnaire, Fibromyalgia Attitudes Questionnaire, Visual analog scales for pain, fatigue, sleep</td>
<td>Mean reduction of 6.4% and 6.8% on the FIQ and FIA, respectively. In terms of the visual analog scales, participants reported a mean improvement of 7.9% for global well-being, 8% for pain, 2.6% for sleep, 8.8% for fatigue and 8.5% for feeling rested on waking. Mean reduction of 37% in SCL-90-R CSI scores. Approximately 50% of the participants were identified as responders defined as 25% improvement on at least half of the measures.</td>
<td>Comprehensive assessment including standardized measures and structured interview. No comparison to control for regression toward the mean; descriptive and inferential statistics not reported; inappropriate use of CSQ and FIQ. Additionally, arbitrary categorization of participants into those who responded/did not respond to treatment, improvement defined as 50% improvement in half of the measures. Not necessary since investigators had objective measures to estimate clinical significance.</td>
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<td>Kabat-Zinn et al. (13)</td>
<td>Generalized Anxiety and Pain Disorder</td>
<td>24 outpatients referred to the hospital stress clinic</td>
<td>Pre/post repeated measures; three-month follow-up</td>
<td>Hamilton Rating Scales (anxiety and depression), Beck Inventories (depression and anxiety), Fear Survey Schedule Mobility Inventory for Agoraphobia</td>
<td>Clinician ratings and self-report measures of anxiety and depression showed statistically significant reductions from preintervention to postintervention. Further, there was maintenance of these changes from postintervention to three-month follow-up. Thirty of the patients had reported at least one panic attack during the week previous to treatment, at posttreatment, five reported experiencing a panic attack in the last week. There were statistically significant reductions in scores on the FFS and MIA from preintervention to postintervention.</td>
<td>Use of DSM-III-R criteria for subject selection and combined uses of clinician ratings with self-report measures are strengths. Lack of comparison to control for regression to the mean; 15 patients were concurrently on antidepressants and 3 were taking anxiolytics during the MBSR program; possible rating bias in knowing which patients participated in a treatment.</td>
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<td>Miller et al. (14)</td>
<td>Generalized Anxiety and Pain Disorder</td>
<td>22 outpatients from the Kabat-Zinn et al. (13) study</td>
<td>Three-year follow-up to 10-week MBSR program</td>
<td>Same as Kabat-Zinn et al. (1992)</td>
<td>Eighteen participants responded. No significant difference in anxiety or depression scores, either by clinician rating or self-report, from postintervention assessment to three year follow-up suggesting that patients maintained their gains from the MBSR program.</td>
<td>Same strengths and limitations as Kabat-Zinn et al. (13). Additionally, 10 patients reported that they received additional treatment of anxiety disorder since participating in the MBSR program.</td>
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<td>Kristeller et al. (15) (1999)</td>
<td>Binge Eating Disorder</td>
<td>21 women not currently receiving treatment for binge eating disorder</td>
<td>Pre/post repeated measures; six-week MBSR program</td>
<td>Binge Eating Scale, Beck Inventories (anxiety and depression) Telephone assessments of binge eating episodes.</td>
<td>Statistically significant reductions in binge eating from four to 1.5 per week; reductions in BES scores (50% reduction in the mean); reductions in anxiety and depression.</td>
<td>Uses of DSM-IV criteria for binge eating disorder and telephone assessments to compliment self-report measures of binge eating are strengths. Lack of comparison to control for regression to the mean; rater bias in knowing that participants were in a treatment.</td>
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<td>Roth (16) (1997)</td>
<td>Mixed medical conditions; mostly chronic pain, anxiety, depression, diabetes, and hypertension</td>
<td>Outpatients at an inner city clinic; 21 English-speaking and 51 Spanish-speaking (Latin American)</td>
<td>Pre/post repeated measures</td>
<td>SCL-90-R for English patients, Beck Anxiety Inventory of Spanish patients, Coopersmith Self-Esteem Inventory, Rosenberg Self-Esteem Inventory, Medical Symptom Check-List</td>
<td>In the English sample, there was a statistically significant change in SCL-90-R GSI scores with a 50% mean reduction from preintervention to postintervention. There was also a statistically significant increase in self-esteem on one of the measures. In the Spanish sample, there was a statistically significant change in BAI scores with a mean 70% decrease in anxiety. There was also a statistically significant increase in self-esteem on both measures. Both groups also reported statistically significant change in the frequency of self-reported medical symptoms with a 47% reduction for the English patients and 41% reduction for the Spanish patients.</td>
<td>No comparison to control for regression to the mean; statistics were not adequately reported; investor did not compare two samples.</td>
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ERRATUM

Dr. Lipsitt reports that two errors appeared in his article: Lipsitt DR. Consultation-Liaison Psychiatry and Psychosomatic Medicine: The Company They Keep. Psychosom Med 2001;63:896–909. The first sentence of the abstract should read:

Objective: The objectives of this review are 1) to briefly describe the parallel historical developments of consultation-liaison (C-L) psychiatry and psychosomatic medicine; 2) to analyze the extent to which the literature of C-L psychiatry and psychosomatic medicine relate to each other, given that both fields have evolved simultaneously in the history of psychiatry; and 3) to propose possible explanations for observed publication patterns in selected C-L resources and the journal Psychosomatic Medicine.

Also, the footnote on page 900 should read:

1Numbers of C-L psychiatrists in the American Psychosomatic Society have significantly decreased since the 1986 survey (D. Drossman, personal communication, March 2001).

ANNOUNCEMENT

Academy of Psychosomatic Medicine 49th Annual Meeting

“Consultation-Liaison Psychiatry: Humane and Scientific” will be the topic of the annual meeting, which will be held November 21 to 24, 2002 at the Loews Ventana Canyon Resort, Tucson, Arizona.

Physical illness intensifies and changes the profound challenges all of us experience about meaning and value in our lives. As psychiatrists of the medically ill, we share the opportunity to confront basic questions about living and dying well. We know that emotional distress and psychiatric illness arise in response to this confrontation, and, as well, shape the experience of our patients in dealing with illness and the problems of recovery, disability, and death. The scientific revolution in psychiatry—the renaissance of a biomedical model emphasizing molecular genetics, neurobiology, and psychopharmacology—provides us with new models of understanding and intervention which complement, but may also exist in dynamic tension with, old paradigms in psychiatry that emphasize a complex and humane psychological understanding of the plight of our patients. The 2002 Annual Meeting of the Academy of Psychosomatic Medicine will focus on the progress we have made toward integration of new scientific understanding and evidenced-based interventions with the humane care of our patients. We hope that this meeting will allow us to review these many developments and to unify the humane and scientific aspects of our work. Accordingly, we encourage submission of workshops and symposia that bring together multiple viewpoints, as well as papers on specific issues of interest to consultation-liaison psychiatry. Abstracts Due: April 6, 2002.

Preliminary program and registration materials available August, 2002. For further information or to receive an abstract submission form contact: Executive Director, A.P.M., 5824 N. Magnolia, Chicago, IL 60660.