

# Mind–Body Approaches to Treating Mental Health Symptoms Among Disadvantaged Populations: A Comprehensive Review

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## Abstract

Mind–body approaches are commonly used to treat a variety of chronic health conditions, including depression and anxiety. A substantial proportion of individuals with depression and anxiety disorders do not receive conventional treatment; disadvantaged individuals are especially unlikely to receive treatment. Mind–body approaches offer a potentially more accessible and acceptable alternative to conventional mental health treatment for disadvantaged individuals, who may not otherwise receive mental health treatment. This review examines evidence for the efficacy of mind–body interventions for mental health symptoms among disadvantaged populations. While rates of utilization were relatively lower for racial/ethnic minorities, evidence suggests that significant proportions of racial/ethnic minorities are using complementary health approaches as health treatments, especially prayer/healers and natural or herbal remedies. This review of studies on the efficacy of mind–body interventions among disadvantaged populations found evidence for the efficacy of mind–body approaches for several mental and physical health symptoms, functioning, self-care, and overall quality of life.

## Introduction

**M**IND–BODY COMPLEMENTARY HEALTH approaches (CHAs) are a diverse group of health care practices focused on the relationships among the mind, body, brain, and behavior that are not currently considered a part of conventional medicine. The National Center for Complementary and Integrative Health lists the following as mind–body practices: acupuncture, massage, meditation (including mindfulness meditation), movement therapies, relaxation (breathing exercises, guided imagery, and progressive muscle relaxation), spinal manipulation, *t'ai chi* or *qigong*, yoga, healing touch, and hypnotherapy ([www.nccam.nih.gov](http://www.nccam.nih.gov)). Traditional healers and prayer are also commonly referred to as mind–body CHAs in the literature. Mind–body approaches are among the most commonly used complementary health approaches, and they continue to increase in popularity.<sup>1</sup> These approaches are used to treat a variety of health conditions, including depression and anxiety.<sup>1–6</sup> More than a third of adults in general<sup>1–3,7,8</sup> and over 50% of those with depression or anxiety report using some type of complementary health approach in the past year.<sup>5</sup> Mind–body CHAs are essential components of mindfulness-based interventions, such as mindfulness-based stress reduction (MBSR) and mindfulness-based cognitive therapy, which

are also widely used to treat depression and anxiety. Mind–body CHAs and mindfulness-based interventions can collectively be referred to as mind–body approaches.

Mind–body approaches offer a potentially more accessible and acceptable alternative to conventional mental health treatment. Depressive disorders are among the most common psychiatric disorders,<sup>9–14</sup> however, an estimated 40%–60% of individuals with depressive disorders do not receive conventional treatment.<sup>11,14,15</sup> Disadvantaged individuals, including those who are racial/ethnic minorities, have less education and income, and are uninsured or underinsured, are even less likely to receive treatment.<sup>15–18</sup> Most of those who do access depression treatment receive it in primary care settings,<sup>9,14,15,19</sup> where antidepressants are the most common form of treatment. However, patient adherence to antidepressants is poor (40%–75%),<sup>20</sup> and many individuals do not consider antidepressants acceptable treatments<sup>21</sup> or prefer to be treated without medication.<sup>22–26</sup> Individuals who are dissatisfied with the availability of conventional treatment, report difficulty getting treatment, or are unable to get treatment are more likely to use CHAs.<sup>27</sup> Individuals are also more likely to report using CHAs because conventional treatment is too expensive.<sup>1,2,7,8</sup> Further, the belief that conventional treatment would not help and

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complementary health approaches would help, independently or in conjunction with conventional treatments, is a commonly reported reason for use.<sup>2,3,5,7,8</sup> Mind–body approaches may be especially relevant for racial/ethnic minorities and individuals of lower socioeconomic status, who are less likely to receive conventional mental health treatment.

Several reviews have found mind–body approaches to be effective in improving symptoms of depression, anxiety, and other chronic health conditions.<sup>28–31</sup> Reviews of yoga as treatment for depression have found that participation in yoga-based interventions is associated with decreases in symptoms of depression and anxiety, improved quality of life and well-being, decrease in stress-related hormones (adrenocorticotropic hormone, cortisol), and improved sleep quality.<sup>32–34</sup> A study examining yoga as a complementary treatment for depressed patients taking antidepressants with residual depressive symptoms found that individuals who participated in a yoga intervention experienced significant reductions in depression, anxiety, anger, neurotic symptoms, limitations of role activities due to emotional problems, and low-frequency heart rate variability.<sup>35</sup> Mindfulness meditation involves intentionally paying sustained attention to ongoing sensory, cognitive, and emotional experience without elaborating or judging any part of that experience.<sup>36</sup> Mindfulness-based interventions have collectively been shown to be at least moderately effective in improving physical and mental health.<sup>37–41</sup> Although evidence suggests the efficacy of mind–body approaches as treatments for depression and anxiety among the general population, few studies to date have examined the efficacy of mind–body approaches in treating depression and anxiety among racial/ethnic minorities and other disadvantaged populations.

Women age 30–69 years with private insurance and higher levels of education and income report the highest rates of CHA use.<sup>1,2,6,8,42</sup> Individuals who are white, Asian, or “other” race/ethnicities report higher rates of CHA use than those of African-American and Hispanic race/ethnicity.<sup>1,2,6,8,42,43</sup> Despite lower rates of overall CHA use among racial/ethnic minorities, substantial proportions of racial/ethnic minorities use CHAs as health treatments.<sup>44–47</sup> Among CHA users, racial/ethnic minorities report higher rates of use of prayer, healers, and natural/herbal remedies as treatments for depression, anxiety, and other chronic health conditions.<sup>45,48,49</sup> Barner et al. (2010)<sup>44</sup> found that 69% of African-Americans in the general population used CHAs (including prayer) in the last 12 months. Herbs, relaxation, and yoga were the CHAs most commonly used to treat health conditions. African-Americans with higher levels of education and income were more likely to use CHAs; those with increased depression, anxiety, and more physician visits were also more likely to use CHAs.<sup>44</sup>

Bazargan et al. (2008)<sup>45</sup> found that among underserved depressed African-American and Hispanic individuals in primary care, 24%–33% reported using CHAs to treat depression. Of those that used CHAs, the majority (58%) used biologically based practices, followed by 47% who used mind–body approaches. Patients who did not have health insurance, had moderate depression, used psychiatric medication, and had poorer self-reported health status were more likely to use CHAs.<sup>45</sup> Among African-American and Hispanic individuals in urban public housing, Bazargan et al. (2005) found that prayer, over-the-counter medicine, and traditional remedies

were the most often used CHAs to prevent or treat illness. Individuals with greater financial strain and poorer health status were more likely to use CHAs to treat an illness.<sup>47</sup>

As the number of individuals integrating mind–body approaches into their healthcare regimen continues to grow, it is increasingly important to understand the efficacy of these approaches in reducing mental health symptoms within specific populations. The following section examines evidence for the efficacy of specific mind–body approaches for treating mental health symptoms among disadvantaged populations. Randomized controlled trials, descriptive studies, and observational studies were included. The discussion of disadvantaged individuals includes adults who are severely marginalized, racial/ethnic minorities and/or of lower socioeconomic status. We identified studies using all possible combinations of the following terms: *severely marginalized, underserved, inner-city, urban, racial minority, ethnic minority, low-income, low socioeconomic status, CAM, complementary alternative medicine, CHA, complementary health alternative, mindfulness, meditation, yoga, mind–body, relaxation, breathing, mindfulness based stress reduction (MBSR), and mindfulness based cognitive therapy (MBCT)*. Studies were excluded if (1) they were reported in a language other than English; (2) the population sample was not considered at risk, as characterized by substantial levels of poverty and/or racial minority status; (3) they did not examine a facet of mental health, such as depression, anxiety, mood, stress, functioning, and/or quality of life; and (4) they did not use some form of mind–body intervention (i.e., only described clinical considerations or utilization rates or reviewed previous studies).

### Mind–Body Interventions in Disadvantaged Populations

The search for intervention studies examining the efficacy of mind–body approaches for mental health symptoms among disadvantaged populations produced limited results ( $n=18$ ). The identified studies provide preliminary evidence that mindfulness-based interventions are efficacious in reducing mental health symptoms<sup>50–55</sup> and improving general health,<sup>56–60</sup> daily functioning, interpersonal relationships, and overall quality of life.<sup>55,61–65</sup> Manuscripts included in the review are presented in Table 1.

#### MBSR

Roth et al.<sup>57</sup> conducted a series of studies examining the effects of a bilingual MBSR program at an urban community health center among primarily Hispanic (64%), low-income (Medicaid [59%]) participants with a variety of medical and mental health problems. Sixty-six percent of the enrolled participants completed the program (attended at least five sessions); 21% completed all eight sessions. MBSR participants demonstrated significant improvement in general health, social functioning, vitality, physical and emotional role functioning, and a trend toward significant improvements on the bodily pain and mental health measures on the Short-Form 36 health survey.<sup>57</sup> Participants’ reported positive experiences with the program and cited improved interpersonal communication and relationships with family members/children, more restful sleep, decreased use of pain and anxiety medications, and greater sense of overall well-being.<sup>58</sup>

TABLE 1. STUDIES EXAMINING MIND BODY APPROACHES TO TREATING MENTAL HEALTH SYMPTOMS AMONG DISADVANTAGED POPULATIONS

<i>Author, year</i>	<i>Population</i>	<i>Diagnostic group</i>	<i>Intervention type</i>	<i>Sessions (n)</i>	<i>Control group?</i>	<i>Participants (n)</i>	<i>Outcome measures</i>	<i>Main findings (results)</i>
Roth and Creaser, 1997	Participants from an inner-city community health center	No formal diagnosis required. Frequent chronic pain, depression, and anxiety.	MBSR	8-wk course	No	86	Medical Symptom Checklist, Symptom Checklist-90-Revised, Beck Anxiety Inventory, Coopersmith Self-Esteem Inventory, Rosenberg Self-Esteem Scale	Participants reported decreased use of medications for pain, sleep, and anxiety; greater peace of mind; and improvement in overall well-being.
Roth et al., 2001	Primarily Hispanic, low SES (39.% on welfare, 28.8% Medicaid, 20.5% no insurance)	A wide range of medical diagnoses were included.	MBSR	8 wk course	No	47	Medical chart review to assess healthcare utilization; number and diagnoses of health center visits.	The average number of participants' chronic care visits decreased by 1.7 in the year after MBSR intervention.
Roth et al., 2004	Inner-city, primarily Hispanic, chronic stress associated with low SES	A wide range of medical diagnoses were included. Most patients experienced chronic stress.	MBSR	8 weekly 2-h sessions	Yes	86	SF-36	The intervention group showed significant improvements in SF-36 scores. The MBSR program was feasible and acceptable, with 66% completing the program.
Samuelson et al., 2007	Drug abuse-related incarceration	No formal diagnosis required	MBSR	6-8 wk, 1-2 sessions per wk, 1-1.5 h long	No	1350	Cook and Medley Hostility Scale, Rosenberg Self-Esteem Scale, Profile of Mood States	MBSR participants showed significant improvements in hostility, self-esteem, and mood disturbance. Women showed more improvement than men.
Abercrombie et al., 2007	Low-income, multiethnic women	Abnormal Papanicolaou smear	Adapted MBSR	6 wk, 2-h weekly sessions	No	8	State-Trait Anxiety Inventory, 25-item Self Compassion Scale, 11-item written-item program evaluation	Women viewed the intervention favorably, although attrition rate was high. Anxiety scores significantly decreased between baseline and post-MBSR but not between baseline and 2-mo follow-up.
Hick and Furlotte, 2010	"Severely marginalized"; poverty stricken and with one or more physical/psychological conditions	History of a major depressive episode(s) and/or bipolar disorder	Radical mindfulness training	8 weekly sessions	No	11	Self-Compassion Scale, Satisfaction with Life Scale, qualitative feedback	Mindfulness training was feasible and acceptable in this population. Participants' self-compassion and satisfaction-with-life scores increased, but the sample size (8 completers) was too small to show significant results.
Dutton et al., 2013	Low-income, ethnic minority women, 67.3% African-American	PTSD, lifetime history of interpersonal violence	MBSR	Ten 1.5-h sessions	Yes	106	Focus groups and individual interviews to assess feasibility and acceptability	The intervention was feasible; 70% of women attended at least 5 of 8 sessions, and it was viewed favorably among participants. Women reported increased awareness, acceptance, and empowerment and decreased stress.

(continued)

TABLE 1. (CONTINUED)

<i>Author, year</i>	<i>Population</i>	<i>Diagnostic group</i>	<i>Intervention type</i>	<i>Sessions (n)</i>	<i>Control group?</i>	<i>Participants (n)</i>	<i>Outcome measures</i>	<i>Main findings (results)</i>
Smith et al., 2015	Inner-city patients from federally qualified health center, 87% African-American, 96.7% female	No formal diagnoses was required.	MBSR Short Form	4 session 120 min each	No	23	Philadelphia Mindfulness Scale, PSS, GAD-7, SF-36	20% reduction in stress on the PSS, significant reduction in GAD-7 scale, improved health-related quality of life
Bowen et al., 2006	Drug abuse-related incarceration	Substance use	Vipassana meditation	10-d intensive course	Yes	305	Daily Drug-Taking Questionnaire, Daily Drinking Questionnaire, Short Inventory of Problems, Drinking-Related Locus of Control Scale, White Bear Suppression Inventory, Brief Symptom Inventory, The Life Orientation Test	Compared with control, meditation patients showed decreases in alcohol-related problems, drug use, and psychiatric symptoms after release from jail, as well as increases in positive psychosocial outcomes.
Simpson et al., 2007	Drug abuse-related incarceration	PTSD, substance use	Vipassana meditation	10-d intensive course	Yes	302	Daily Drinking Questionnaire, Daily Drug-Taking Questionnaire, Short Inventory of Problems, Brief Symptom Inventory	Those who participated in the intervention reported less frequent drinking and illicit drug use 3 mo after intervention.
Moadel et al., 2007	Primarily African-American or Hispanic women with breast cancer	Breast cancer	Yoga	12-wk, 1.5-h weekly classes	Yes	164	Functional Assessment of Cancer Therapy, Functional Assessment of Chronic Illness Therapy-Fatigue and Spiritual, Distressed Mood Index	Control group patients reported significant decreases in well-being while patients in the intervention group reported stable scores over time.
Pullen et al., 2010	Patients with heart failure, 95% African-American	Advanced heart failure	Yoga	Sixteen 1-h sessions, biweekly	Yes	40	Treadmill stress test, blood pressure, Minnesota Living with Heart Failure Questionnaire, 12-lead ECG, girth measurements, serum biomarkers, waist circumference	Participants in the intervention group increased their exercise capacity as measured by a treadmill stress test and peak oxygen consumption. Participants also reported significant improvements in quality of life.
Patients with heart failure, 62% African-American	Congestive heart failure	Yoga	Sixteen 1-h sessions, biweekly	No	14	Body weight, Depression-Arkansas Scale, Kansas City Cardiomyopathy Questionnaire	The intervention was feasible and acceptable, with 13 of 14 patients completing the program. Patients showed significant weight reduction, lessening of depressive severity, and trends toward increased quality of life.	

(continued)

TABLE 1. (CONTINUED)

Author, year	Population	Diagnostic group	Intervention type	Sessions (n)	Control group?	Participants (n)	Outcome measures	Main findings (results)
Franzenblau et al., 2008	Women, 50% African-American	Female victims of interpersonal violence	Yogic breathing	4 d (45 min per day)	Yes	40	Beck Depression Inventory II	Women who were trained in yogic breathing techniques alongside giving testimonials about their experience with interpersonal violence experienced significant reduction in depressive symptoms.
Margolin et al., 2006	35% African-American, 19% Hispanic	Opiate Dependent (DSM-IV)	Buddhist-based spiritual self-therapy)	8 weekly session	Yes	72	Semi-structured interviews, Risk Assessment Battery, reaction time task, Multidimensional Measure of Religiousness/Spirituality, Likert scale measuring motivation for HIV prevention and daily expression of spirituality	Retention was high. Participants viewed the intervention favorably. The intervention group showed significant decreases in risk behaviors and drug use compared with the control group, increased motivation for HIV prevention, and increased meditation practice.
Beitel et al., 2007	54% African-American or Hispanic, 80% unemployed or disabled, 38% HIV-positive	Opiate dependent (DSM-IV); 77% also met criteria for cocaine abuse or dependence	Buddhist-based spiritual self-therapy	8- to 12-wk program course (12 wk for HIV-positive participants)	No	39	Post-treatment questionnaire used to assess health behavior change, semi-structured interviews designed to elicit responses regarding clients' experience in treatment	Intervention was very popular among participants and correlated to behavioral change (reduction of drug use) and improved personal functioning.
Jallo et al., 2008	African-American women	Pregnant	Relaxation guided imagery audio CDs	12 wk, daily CD use	No	30	Daily practice logs	Participants reported reduced anxiety and increased ability to handle stress as a result of the intervention.
Laperriere et al., 2005	67% African-American, 16% Hispanic, 80% unemployed	AIDS (CDC classification)	Cognitive-behavioral stress management	10 weekly 2-h sessions	Yes	451	Beck Depression Inventory	Cognitive-behavioral stress management was effective in lowering depression scores up to 1 year after study completion for both participants who received the in-person intervention and the low-intensity control group who received the same information via videotape.

MBSR, mindfulness-based stress reduction; SES, socioeconomic status; PTSD, post-traumatic stress disorder; PSS, Perceived Stress Scale; GAD-7, 7-item Generalized Anxiety Disorder; SF-36, 36-item short form; ECG, electrocardiography; DSM-IV, *Diagnostic and Statistical Manual of Mental Disorders*, fourth edition; CDC, Centers for Disease Control and Prevention.

MBSR participants also demonstrated a significant decrease in their total number of medical and chronic care visits.<sup>56</sup>

Smith et al. (2015)<sup>55</sup> implemented a short-form MBSR program among 23 patients from an inner-city federally qualified health center. The abbreviated 4-week course met for 120 minutes each week; participants were given CDs with guided meditations and asked to practice for 15–25 minutes daily. After the intervention, participants reported a 20% reduction in stress, increased mindfulness, reduced anxiety, and improvements in social functioning.<sup>55</sup> This study highlights that mindfulness participants experienced improvements in mental and physical well-being even when the implementation time period is quite short.

In another study, Hick and Furlotte (2010) piloted an MBSR intervention within a local community health center in Canada that served economically disadvantaged individuals with multiple medical, psychological, and functional challenges.<sup>64</sup> A total of 22 participants attended the first informational class, 11 attended the second class, and 8 finished the course. All but 1 of the participants was homeless, or near homeless, and all had experienced one or more episodes of major depression. At the end of the MBSR intervention, participants reported increased self-compassion and life satisfaction. Participants also experienced less depression and improved relationships, were able to positively shift their perspectives related to life experiences, and found the intervention to be important.

Similarly, Abercrombie et al. (2007)<sup>54</sup> assessed the acceptability and feasibility of an MBSR program in a health center setting ( $n=8$ ). Multiethnic women (37.5% African or African-American, 12.5% white, 37.5% Latina, 12.5% Asian) with abnormal Papanicolaou smears were enrolled in 2-hour weekly MBSR classes for 6 weeks. Only 8 of the 51 women who were initially recruited completed pre–post measures. However, women reviewed the program favorably and displayed significant pre–post decreases in anxiety.

Dutton et al (2013)<sup>61</sup> also examined an MBSR intervention among 53 low-income, predominantly African-American (67.3%) women with post-traumatic stress disorder and a history of intimate partner violence. Most of the women were clinically depressed, and almost all had experienced lifetime trauma, including childhood sexual abuse and sexual assault in addition to intimate partner violence. The intervention consisted of 10 weekly 1.5-hour-long sessions, in addition to a 5-hour retreat near the final week. Of the women enrolled in the MBSR intervention, 70% were treatment completers (completed 5 or more sessions); treatment completers attended a mean of 7.9 sessions. The authors found that intervention feasibility was influenced by the participants' ability to get to the MBSR groups and the availability of free childcare or reimbursement for childcare. The most frequently reported benefits from participating in the MBSR intervention were increased awareness, self-acceptance, and self-empowerment; nonreactivity; improved self-care; and decreased distress.<sup>61</sup> Participants demonstrated a basic working knowledge of mindfulness and began to embed mindfulness in their daily activities.<sup>61</sup>

### Yoga

Moadel et al. (2007)<sup>66</sup> examined the effects of a 12-week Hatha yoga intervention on distressed mood and quality of

life among 128 racial/ethnic minority (42% African-American, 31% Hispanic) female breast cancer survivors. Eighty-four women were randomly assigned to the intervention group and 44 were waitlist controls. The yoga intervention included 1.5-hour-long weekly classes for 12 weeks and was offered at three locations within the designated community cancer center. Intervention participants attended 0–19 (mean, 7) yoga classes during the 3 months of the intervention. Twenty-six participants did not attend any classes; 8 of these reported practicing yoga at home multiple times per week. Attendance varied by race, such that 56% of Hispanic, 26% of African-American, and 17% of white women did not attend any classes. After adjustment for quality of life, medical conditions, and sociodemographic status, fatigue, radiation, and hormonal treatment accounted for 40% of the variance in attendance. Three months after the intervention, the control group reported significantly greater decreases in social well-being than the intervention group. Further analyses among the subset of participants not receiving chemotherapy ( $n=71$ ) revealed that at the 3-month follow-up, the control group reported increased distressed mood and decreased emotional well-being, while the intervention group reported decreases in distressed mood and increased emotional well-being. These findings indicate that yoga may serve as a protective factor for social and overall well-being among chronically ill populations.<sup>66</sup>

Pullen et al. (2010)<sup>59</sup> examined the benefits of yoga for African-American patients with heart failure. Forty patients with systolic or diastolic heart failure were randomly assigned to yoga or standard medical care. Participants in the yoga group attended 16 one-hour yoga sessions during an 8- to 10-week period. Post-test scores measuring quality of life significantly increased for yoga participants but not standard care participants. Furthermore, the yoga group displayed an increase of 22% in their treadmill time on the post-treatment exercise test, whereas the standard care group's time decreased by 5%.<sup>59</sup> Kubo et al. (2011)<sup>60</sup> also examined a yoga intervention for heart failure in a multiethnic population (62% African-American). In this pilot study, 14 patients participated in two 1-hour yoga classes for 8 weeks. After the intervention, significant decreases occurred in body weight (3.5-pound decrease) and depression; additionally, disease-specific quality of life scores (Kansas City Cardiomyopathy Questionnaire) trended toward a significant increase.<sup>60</sup>

Franzblau et al. (2008)<sup>67</sup> examined whether learning yogic breathing techniques and giving testimony about personal experience with interpersonal violence would lower battered women's symptoms of depression. Forty women (50% African-American, 50% white) were randomly assigned to one of four conditions: testimony, yogic breathing, testimony and yogic breathing, or control. Participants in the yogic condition were taught breathing techniques, including how to extend and reduce inhalations and exhalations, use sound with the breath to increase relaxation, and focus on the breath to create a sense of stillness in the mind and body. Basic yoga poses were also incorporated to complement the breathing. Participants in the testimony condition were paired with a trained listener of the same race and asked to recount their experience with trauma. Each session lasted 45 minutes and took place over a 4-day period. Participants in the combined condition completed a total of 3 hours of intervention time, while the breathing and testimony alone groups

completed 1.5 hours total. All participants attended 100% of their designated sessions.

Women in all treatment conditions reported statistically significant pre–post decreases in depression. Women in the combined yogic breathing and testimony condition experienced the greatest decreases in depression. Participants in the yogic breathing condition reported significantly fewer depression symptoms than those in the control group, while the difference in depression symptoms between the testimony and control group were not significant. This suggests that the use of yogic breathing and/or similar cognitive-physiological techniques for reducing depressive symptoms in abused populations may be more effective than talk or supportive therapy alone.<sup>6,7</sup>

#### *Other mind–body interventions*

A study by Laperriere et al. (2005)<sup>68</sup> examined the effects of a 10-week cognitive-behavioral stress management (CBSM) intervention for depression among 451 disadvantaged, predominantly racial/ethnic minority (67% African-American, 16% Hispanic) women with AIDS. The women were randomly assigned to a CBSM intervention group or a low-intensity comparison group, which received the same information provided in the CBSM group via videotape as opposed to in-person. Each session was 120 minutes long, with 90 minutes devoted to stress management and 30 minutes to a relaxation component. One year after intervention, the CBSM group reported significantly greater decreases in total, somatic, and cognitive Beck Depression Inventory subscale scores than the control group. Additionally, there was a dose-response effect for the intervention group whereby the women who completed at least seven classes reported greater decreases in Beck Depression Inventory scores than women who completed fewer than seven classes.<sup>68</sup>

Margolin and colleagues<sup>65</sup> implemented a Buddhist-based Spiritual Self-Schema (3-S) intervention aimed to increase motivation for HIV prevention among inner-city drug users. Seventy-two (35% African-American, 19% Hispanic) methadone-maintained patients who met *Diagnostic and Statistical Manual of Mental Disorders*, fourth edition, criteria for opiate dependence and were categorized by clinicians as probable “treatment failures” were enrolled and randomly assigned to an 8-week intervention trial or standard of care. Participants in the intervention group were assigned to receive weekly 3-S individual therapy or both individual and group therapy sessions. There were no significant differences between the two 3-S conditions. Retention was high, with 61 of 72 (85%) participants completing the full program.

Most (86%) clients in the therapy group reported a decrease in drug use, which was confirmed by urine analyses.<sup>65</sup> Compared to the standard of care group, clients in the 3-S intervention group reported greater increases in motivation for HIV prevention and were 8 times less likely to have engaged in HIV risk behavior after treatment (Risk Assessment Battery). The investigators subsequently conducted semi-structured interviews with a subgroup ( $n=39$ ) of intervention completers to assess their perceptions of the program.<sup>65</sup> Participants reported that the intervention had at least a moderate effect on decreasing drug use, decreasing cravings for drugs, bringing them closer to quitting drug use, increasing the experience of spirituality in daily life, and in-

creasing prevention of the transmission of HIV and prevention of other diseases. Most (69%) participants reported that their relationships and overall functioning within self and others improved as a result of the intervention, and 26% reported that the therapy led them to be more mindful in their daily lives. Participants reported that meditation was the aspect of the therapy that they liked most and thought was most helpful. The intervention was extremely well liked; almost all (97%) of the participants indicated they would like to continue receiving the treatment after it ended.<sup>62</sup>

Jallo et al. (2008)<sup>69</sup> examined an in-home 12-week relaxation/guided imagery mind–body intervention aimed to promote stress management among 30 African-American pregnant women. The intervention included three different 20- to 30-minute audio CDs containing relaxation and guided-imagery tutorials. At the initial study visit, participants were introduced to relaxation/guided imagery and provided with CDs and instructions to practice using the CDs daily during the 12-week intervention. Women were given daily logs to record how frequently they practiced using the CDs and to report their perceived benefits of using the techniques. During the 12-week intervention period (84 days), the women reported an average of 62.53 practice days. Their most notable perceived benefits included increased ability to relax, decreased stress, releasing anxiety, and an easier time falling and staying asleep.<sup>69</sup>

#### *Mindfulness-based interventions among incarcerated individuals*

The current search was expanded to include studies investigating the effects of mind–body approaches among incarcerated individuals. Samuelson et al. (2007) examined the use of an 8-week MBSR intervention among an incarcerated population in six correctional institutions in Massachusetts.<sup>53</sup> The intervention was offered as one of several options in a rehabilitation program for individuals convicted for drug-related activity. Of the 1953 inmates who initially enrolled, 1350 (69%) met program completion criteria that included attending 80% of classes. After the intervention, participants reported significantly reduced hostility, with greater reductions for women than men, and statistically significant increases in self-esteem, with greater increases for women than men. The most dramatic improvements were found on the total mood disturbance measure, with a 38.5% decrease for women and 28.4% decrease for men. Notably, women reported higher distress levels at baseline. Although this study had no formal control group, researchers obtained pre and post paired self-report measures at some correctional facilities from inmates who did not complete the intervention; no significant changes ( $p>0.05$ ) were found on any of the scales. When the same individuals underwent the intervention at a later time period, they experienced significant changes similar to those of the first group.<sup>53</sup>

Simpson et al. (2007)<sup>70</sup> found that participation in a 10-day Buddhist Vipassana meditation course was associated with significantly greater reductions in alcohol and illicit drug use compared with treatment as usual among 88 individuals who were incarcerated primarily for drug- and alcohol-related reasons. The investigators also assessed participants for symptoms of post-traumatic stress disorder at baseline and 3 months after the intervention and did not

find significantly different reductions in symptom severity for program participants compared with those who received no intervention.

Bowen et al. (2006)<sup>51</sup> implemented a similar Vipassana meditation intervention among 57 incarcerated individuals (32% were unemployed before incarceration) and found that course participants had significantly decreased alcohol, marijuana, and crack cocaine use 3 months after intervention compared with individuals who received no intervention. Furthermore, participants also reported significantly fewer psychiatric symptoms after intervention and increased levels of optimism.

### Discussion and Suggestions for Future Research

Mind body approaches are being used at increasingly higher rates as treatments for depression, anxiety, and other chronic health conditions. Conventional mental health treatment is underused and mind-body approaches are often a more accessible and acceptable complement or alternative. These treatments are most commonly used by middle-aged, non-Hispanic white women with higher levels of education and income.<sup>1,2,8,42</sup> However, substantial evidence suggests that these treatments may be a particularly important option for high-risk disadvantaged individuals, including those who have difficulty accessing conventional treatments because of availability or cost and racial/ethnic minorities.

Significant evidence supports the efficacy of mind-body approaches for many mental and physical health symptoms in the general population.<sup>28–30,32–34,37–41,58–60</sup> However, in a meta-analysis, Goyal et al. (2014) found that meditation programs were similar in effectiveness to exercise, progressive muscle relaxation, or cognitive-behavioral therapy when compared with inactive controls.<sup>31</sup> In a meta-analysis of mindfulness-based therapies, Khoury et al. (2013) found that these treatments were more effective than psychoeducation, supportive therapy, relaxation, and imagery, but they were not more effective than antidepressants or cognitive-behavioral therapy.<sup>38</sup> Although mind-body CHAs may not be more effective than existing evidence-based treatments for mental health symptoms, they have several other potential benefits. Mind-body approaches are an alternative for those who prefer to be treated without medication or have difficulty with the uptake of cognitive-behavioral therapy concepts; they offer a means for individuals to learn skills to help them self-manage their symptoms; and they provide a mechanism for treating symptoms when individuals have difficulty accessing conventional treatments because of location, long wait times, or affordability.

Our review of mindfulness-based interventions among high-risk disadvantaged populations produced limited results ( $n = 18$ ). Seven of the 18 studies we reviewed examined the efficacy of MBSR.<sup>54–58,61,64</sup> The remaining studies reviewed the efficacy of interventions based on mindfulness-based interventions, including yoga, meditation, and guided imagery.<sup>51,59,60,62,64–70</sup> The studies reviewed here used mindfulness-based interventions in a wide range of high-risk disadvantaged populations, including racial/ethnic minorities, individuals with chronic health conditions (including AIDS and breast cancer), drug and alcohol users, and victims of interpersonal violence and trauma. All of the reviewed studies provided evidence

that mindfulness-based interventions are effective in improving physical and mental health, functioning, self-care, and overall quality of life. Among incarcerated individuals, participation in mindfulness-based therapies was similarly associated with a reduction in mood disturbance and drug related behaviors.<sup>51,53,70</sup>

The reviewed studies provide preliminary evidence of the feasibility and acceptability of mindfulness-based interventions among high-risk disadvantaged populations. The studies of MBSR among disadvantaged individuals reported program completion rates ranging from 66% to 70%,<sup>57,61,64</sup> which is slightly higher than retention rates that have been reported for other evidence-based mental health treatments. These relatively high completion rates are particularly significant given the time-intensive nature of MBSR. Rates of completion were similarly high among incarcerated individuals (69%).<sup>53</sup> Furthermore, several studies indicated that participants believed the skills they acquired were important; they were interested and willing to practice MBSR techniques on their own, even after intervention ended; and the mindfulness techniques they learned became an integral part of their lives.<sup>57,61,62</sup> Several studies suggested that offering the interventions in multiple languages,<sup>57</sup> providing childcare and transportation, allowing opportunities for consistent feedback from participants,<sup>61</sup> and designing programs in a way that will not conflict with participants' religious beliefs would further improve feasibility and acceptability and promote personal use.<sup>61,62</sup> Finally, one study showed that practicing mindfulness can lead to substantial changes in mental and physical well-being even when the implementation time period is shortened.<sup>55</sup>

A few limitations of the reviewed studies should be noted. Several of the studies had small sample sizes and did not include active control groups. The interventions that were examined outside of MBSR varied in the mind-body approaches that were employed and in the structure and delivery of the protocols; thus, there is a lack of confluent evidence in one mind-body approach among high-risk disadvantaged populations. Furthermore, while it is encouraging to see preliminary evidence that mindfulness-based interventions are effective in a wide range of high-risk disadvantaged populations, this is also a shortcoming in that there is not sufficient evidence to support one approach within one population.

Nonetheless, the findings from the reviewed studies in terms of feasibility, acceptability, and efficacy are promising for conducting larger studies of mindfulness-based interventions among high-risk disadvantaged populations. Future designs should include active control groups and larger sample sizes and should collect longitudinal efficacy data. Research focused on mindfulness-based interventions must grow to parallel the substantial rate of utilization. These approaches offer a great opportunity for underserved individuals who may not otherwise receive treatment to improve their physical and mental health, functioning, and well-being.

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