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Improving physical and mental health in frontline mental health care providers: Yoga-based stress management versus cognitive behavioral stress management

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ABSTRACT

The need for brief, low-cost, easily disseminable, and effective interventions to promote healthy lifestyles is high. This is especially true for mental health providers. The authors developed two studies to compare the impacts of Cognitive Behavioral Stress Management (CBSM) and Yoga-Based Stress Management (YBSM) interventions for health care professionals. Study 1 offered an 8-week YBSM intervention to 37 mental health care participants and collected health data pre- and post. Study 2 offered YBSM and CBSM classes to 40 randomly assigned mental health care providers and collected mental and physical health data at four time points. In Study 1, using *t* tests, the YBSM intervention affected a number of mental and physical well-being indices pre to post. In Study 2, using linear mixed modeling, YBSM and CBSM groups both improved significantly ($p < .05$) in fruit and vegetable intake, heart rate, alcohol consumption, relaxation and awareness, professional quality of life, compassion satisfaction, burnout, depression, and stress levels. There was a group by time effect for coping confidence (CBSM increased more, $p < .05$, $F = 4.34$), physical activity (YBSM increased more, $p < .05$, $F = 3.47$), overall mental health (YBSM increased more, $p < .10$, $F = 5.32$), and secondary traumatic stress (YBSM decreased more, $p < .10$, $F = 4.89$). YBSM and CBSM appear to be useful for health care professionals' mental and physical health. YBSM demonstrates some benefit above and beyond the extremely well studied and empirically supported CBSM, including increased physical activity, overall mental health, and decreased secondary traumatic stress benefits.

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Workplace stress can compromise employees' mental and physical health and significantly contribute to corporate health care costs (Eisen, Allen, Bollash, & Pescatello, 2008). Stress is associated with elevated blood pressure, weight gain, anger, depression, anxiety, and poorer health-related quality of life along

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with worse health behaviors such as diet, exercise, and alcohol use (Park & Iacocca, 2014). Recent estimates put the overall annual cost of work-related stress to the United States economy at \$300 billion (Rosch, 2001). These costs are due in large part to turnover and absenteeism, both of which increase with higher levels of workplace stress (Bureau of Labor Statistics, 2001).

Although studies have found high levels of work-related stress across occupations, frontline mental health care providers—personnel who provide direct services to those with serious mental health issues, including nurses, social workers, psychologists, aides, case managers, and occupational therapists—may be particularly prone to stress exposure (e.g., Gaither et al., 2008; Lee, Lim, Jung, & Shin, 2012; Thorsteinsson, Brown, & Richards, 2014). Frontline mental health care providers' stressors include a high workload, demanding caregiving relationships with patients, secondary traumatization, and potentially difficult interactions with other mental health professionals on multidisciplinary teams. Finally, patient suicide is a major stressor, after which a majority of mental health care providers report symptoms of post-traumatic stress (Rossler, 2012). This group's high stress levels may adversely affect their mental and physical health as well as their work performance and satisfaction. For example, burnout, involving work-related anger, frustration, and exhaustion, is particularly prevalent among frontline mental health providers (Acker, 2011; Aiken et al., 2002; Janssen, deJonge, & Bakker, 1999; Lasalvia et al., 2009; Leiter & Maslach, 2004; Paris & Hoge, 2010; Spence Laschinger, Leiter, Day, & Glin, 2009). Reducing stress may be essential for maintaining job satisfaction and preventing turnover among frontline mental health providers as well as for promoting their mental and physical well-being.

Employer-based stress management and yoga programs

Research has accrued supporting the benefits of short-term stress management programs on mental and physical well-being (e.g., Cognitive Behavioral Stress Management [CBSM]: Antoni et al., 2006; cognitive-behavioral therapy: Granath, Ingvarsson, von Thiele, & Lundberg, 2006; relaxation, and mindfulness-based stress reduction [MBSR]: Kabat-Zinn, 1990; Shapiro, Brown, & Astin, 2011; Winterdyk et al., 2008). A review of 36 studies of stress management interventions, including cognitive-behavioral, relaxation, organizational, alternative, and multimodal, found that all five categories of stress management interventions were effective in reducing workplace stress (Richardson & Rothstein, 2008). Two meta-analyses of workplace-based stress management interventions showed that cognitive-behavioral interventions produced larger effect sizes than relaxation-based and other stress management modalities, though that other stress management interventions were still largely efficacious (Bhui et al., 2012; Van der Klink, Blonk, Schene, & Van Dijk, 2001). All reviews

concluded that further study and comparison of person-level interventions was necessary. Additionally, none of the above reviews examined yoga or mindfulness-based stress management interventions.

Only in the past decade has yoga been examined as a workplace wellness modality, with emerging literature suggesting that yoga may successfully reduce workplace stress (e.g., Granath et al., 2006; Lin et al., 2015). Yoga is unique in its mindfulness and exercise components for stress management, in addition to being more desired by many participants than more traditional stress management interventions (e.g., Chong et al., 2011; Lin et al., 2015). In one study, a group receiving yoga reported significant reductions in perceived stress and back pain, and a substantial improvement in psychological well-being, compared to a control group (Hartfiel et al., 2012). These findings have been replicated and extended by studies demonstrating that yoga improved musculoskeletal fitness, state anxiety (Cheema et al., 2013), perceived stress, sleep quality, and heart rate variability (Wolever et al., 2012). Yoga has been shown to be efficacious in improving a range of health conditions, including depression obesity, diabetes, substance abuse, and asthma (Ross & Thomas, 2010). One study of employee wellness in a large financial company found that yoga and cognitive stress management programs were related to improvements in well-being and decreases in stress (Granath et al., 2006). Therefore, we anticipated that combining the documented salutary effects of yoga with the strong, well-supported aspects of cognitive stress management may provide a potent intervention in the workplace.

The present study

We designed and tested an 8-week workplace wellness intervention combining yoga and aspects of cognitive stress management, or Yoga Based Stress Management (YBSM; Kripalu Center for Yoga & Health). To our knowledge, no such intervention combination has been studied in previous literature. This new type of intervention is a manualized yoga intervention and is based on the principles of Kripalu yoga, which conceptualizes yogic practices as an opportunity to cultivate mindfulness. This intervention also integrates psychoeducation on stress management consistent with yogic techniques and principles, similar to mindfulness-based stress reduction.

We tested this intervention and its impacts on mental and physical health in frontline mental health care providers in a pre-post pilot study for feasibility and preliminary efficacy (Study 1). We then conducted a second study in which we compared it directly to a traditional Cognitive-Behavioral Stress Management (CBSM; Antoni et al., 2006) intervention with mental health care providers, measuring changes in a range of well-being indices for a period of 8 months (Study 2). CBSM was originally developed to reduce stress

and improve a range of psychological and physical benefits for persons with HIV and survivors of cancer. Reported effects include more positive and less negative affect, decreased stress, and less depression and anxiety (Antoni et al., 2001, 2006; Penedo et al., 2006). CBSM has been shown to be efficacious for a number of clinical populations and samples, though has yet to be tested in a nonclinical population. For the present study the CBSM protocol was adapted from the 10-week, 1.5-hour per session per week protocol to an 8-week, 1-hour per session per week protocol. This study provides a secondary aim of examining the effects and potential feasibility of CBSM in a nonclinical population.

We selected an understudied but highly stressed group, mental health care providers (Chen et al., 2014; Corrigan, Holmes, & Luchins, 1995; Gökçen et al., 2013; Weaver, 1984). In spite of their high workplace stress, this group has rarely been the focus of workplace stress management interventions. Further, this population allowed us to test whether stress management programs reduce burnout, a serious and common issue for this group.

There are two additional strengths of Study 2. First, because nearly all of the research on workplace stress-management or wellness programs have short-term follow-up periods (i.e., most measured participants only at end of intervention), the extent to which effects endure beyond the intervention itself remains unknown. Thus, we implemented a longer-term follow up to determine whether the effects of such programs last. Second, because many stress management programs have specifically focused only on stress and emotional well-being (e.g., Horan, 2002; Lapp & Attridge, 2000; McCraty, Atkinson, & Tomasino, 2003; Sidle, 2008), we aimed to determine whether such programs have broader impacts on well-being, including quality of life and health behaviors as well as stress and burnout.

In sum, building on preliminary evidence that suggests that cognitive stress management interventions and yoga interventions are effective in promoting health and reducing stress, this study sought to add useful elements from cognitive stress management to yoga to form a YBSM intervention, and then examine the differential effectiveness of YBSM and standard CBSM on a set of mental and physical health indices, including diet, exercise, sleep, stress, depression, anxiety, alcohol use, and compassion fatigue/burnout. The ultimate goal of this line of research is to test yoga-based and cognitive behavioral-based stress management interventions for preventive and health-promotive impacts, understand more about how and why such interventions can be efficacious, and refine and disseminate them to at-risk populations such as frontline mental health care providers through work-based yoga interventions and interventions. This study also examined feasibility of these interventions in a nonclinical yet highly stressed population.

Study 1

Study 1 aimed to examine preliminary feasibility and efficacy of a YBSM intervention for frontline mental health care providers and to examine preliminary effects of this intervention on a range of psychological and physical well-being outcomes in a pre–post study.

Method

Participants

Forty-four employees of Clinical and Support Options (CSO), a multisite mental health center with locations throughout western Massachusetts, were recruited and enrolled. Thirty-seven participants completed Time 1 (baseline) and Time 2 (end of intervention) surveys; seven participants completed only the Time 1 survey. There were no statistically significant differences between those who completed both surveys and those who did not on major demographic variables. Of the final 37 participants who completed both surveys, 83.8% were female and 83.8% were White. Mean age was 41.2 (*SD* 5.7).

Procedure

CSO has several hundred employees including frontline mental health care providers and administrative staff. The CSO conducted a workplace wellness program with the YBSM intervention. Once participants signed up for the program, they were invited via e-mail and phone to participate in a research study by completing questionnaires.

Participants who expressed interest in participating in the study were sent a link for an online survey and an online consent form 2 to 3 weeks before the start of the study and one week following the end of the 8-week intervention. Study participants completed the online surveys before the start of the first class.

Measures

Depression, anxiety, and stress. Distress was assessed with the 21-item Depression, Anxiety and Stress Scale (DASS-21; Lovibond & Lovibond, 1995). The DASS-21 comprises three seven-item subscales: depression (“I found it difficult to work up the initiative to do things”), anxiety (“I found it hard to wind down”), and stress (“I found it difficult to relax”). For each statement, participants are asked to rate how much a given statement applied to them “over the past week.” The DASS has good reliability and validity (e.g., Lovibond & Lovibond, 1995).

Health-related quality of life: Physical and mental health. The Short Form 12 (SF-12) survey health-related quality of life measure consists of 12 items and produces separate scores for a mental health-related quality of life

component (MCS) and a physical health-related quality of life component (PCS; Ware, Kosinski, & Keller, 1996). An example of a mental health item is “How much of the time in the past two weeks have you felt downhearted and blue?” on Likert-type scale from 1 (*all of the time*) to 6 (*none of the time*). An example of a physical health item includes “during the past four weeks, how much did pain interfere with your normal work (including both work outside the home and housework)?” Items were answered on yes/no or Likert-type scales. The SF-12 is widely used in research on quality of life (Grozdev et al., 2012).

Coping skills. Coping skills were assessed with the 13-item Measure of Current Status (MOCS-A; Carver, 2006). Participants respond to each question on a 5-point Likert-type scale from 1 (*I cannot do this at all*) to 5 (*I can do this extremely well*). The MOCS-A has been shown to be reliable and valid (Antoni et al., 2006). The MOCS-A has five subscales; we examined three subscales as a part of this study: coping skills, awareness, and relaxation subscales. A coping skills subscale item is “It’s easy for me to decide how to cope with whatever problems arise,” an awareness subscale item is “I notice right away whenever my body is becoming tense,” and a relaxation subscale is “I am able to use mental imagery to reduce any tension I have.” This scale has shown good validity and reliability in previous studies (Carver, 2006).

Emotion regulation. Emotion regulation was assessed with the 36-item Difficulties in Emotion Regulation Scale (DERS; Gratz & Roemer, 2004). Six subscales include nonacceptance, goals, impulse, strategies, clarity, and awareness. Items are rated on a 5-point scale from 1 (*almost never*) to 5 (*almost always*) (Gratz & Roemer, 2004). The DERS was initially validated in adults (Gratz & Roemer, 2004).

Mindfulness. The Five Facet Mindfulness Questionnaire (FFMQ; Baer et al., 2006) is a 39-item scale. Responses are given on a 5-point Likert-type scale and measure five facets of mindfulness: observing (attending to or noticing internal and external stimuli), describing (noting or mentally labeling these stimuli with words), acting with awareness (attending to one’s current actions), nonjudging of inner experience (refraining from evaluations), and nonreactivity (allowing thoughts and feeling to come and go). The FFMQ has been widely studied and has been normed in nonclinical samples.

Self-compassion. Self-compassion was assessed with the 26-item Self-Compassion Scale-Short Form (SCS; Raes, Pommier, Neff, & Van Gucht, 2011). Items are rated from 1 (*almost never*) to 5 (*almost always*) The SCS includes six subscales: self-kindness, self-judgment, common humanity, isolation, mindfulness, and overidentification. The SCS measures one’s ability to be forgiving and kind to oneself in difficult circumstances and was developed and validated on a nonclinical sample (Raes et al., 2011).

Results

To examine the feasibility of the YBSM intervention, participants reported on a scale of 1 to 10 (*not at all* to *very much*), the perceived enjoyment of this intervention ($M = 8.24$, $SD = 1.23$), the perceived utility of this intervention ($M = 7.93$, $SD = .79$), and how much they anticipate to use the skills learned in the future ($M = 8.12$, $SD = 1.02$). Results demonstrated that participants found the intervention to be useful and enjoyable.

To examine preliminary efficacy of the YBSM intervention, we examined changes from preintervention to postintervention on all measures. We used repeated-measures t tests for all comparisons. Analyses showed statistically significant ($p < .05$) increases in relaxation, coping confidence, self-kindness, self-compassion, general mental health, general physical health, and mindfulness (see Table 1).

Discussion

Study 1 provided preliminary support for the feasibility and effectiveness of the YBSM intervention, suggesting this workplace-based intervention for mental health care providers may improve a range of aspects of mental and physical well-being, and that participants found the interventions appealing.

Table 1. Study 1 t -tests and chi square tests for pre- to postintervention outcomes.

	Time 1 M (SD)	Time 2 M (SD)
DASS depression*	2.72 (1.49)	1.63 (1.26)
DASS anxiety [†]	3.10 (1.07)	2.12 (1.16)
DASS stress**	5.78 (1.16)	4.08 (1.15)
MOCS relaxation*	2.87 (.96)	3.30 (1.06)
MOCS awareness	3.56 (.90)	3.66 (.86)
MOCS assertion	3.38 (.86)	3.58 (.96)
MOCS coping confidence*	3.54 (.60)	3.81 (.61)
SCS self-kindness**	3.89 (1.32)	4.64 (1.52)
SCS self-judgment	3.46 (.98)	3.32 (.92)
SCS common humanity*	3.97 (1.43)	4.58 (1.31)
SCS isolation	3.84 (1.09)	3.80 (1.01)
SCS mindfulness	4.63 (1.45)	4.93 (1.23)
SCS overidentification	3.68 (.87)	3.76 (.78)
SF-12 MCS mental health [†]	35.02 (9.17)	42.68 (9.41)
SF-12 PCS physical health*	40.85 (10.83)	49.09 (6.54)
DERs nonacceptance	10.95 (3.80)	10.19 (4.23)
DERs difficulties goals	13.09 (2.87)	12.57 (2.93)
DERs impulse control [†]	11.45 (1.97)	10.91 (2.14)
DERs emotional awareness	23.05 (4.35)	23.57 (4.23)
DERs limited access to emotion regulation strategies*	23.05 (4.37)	23.57 (4.24)
DERs lack of emotional clarity	11.91 (1.16)	11.83 (1.61)
FFMQ mindfulness***	33.83 (6.07)	42.76 (6.83)

Note. DASS = Depression, Anxiety, and Stress Scales, MOCS = Measure of Current Status, SCS = Self Compassion Scale, SF-12 = Short Form 12 survey, DERs = Difficulties with Emotion Regulation Scale, FFMQ = Five Facet Mindfulness Questionnaire.

[†] $p < .10$, * $p < .05$, ** $p < .01$, *** $p < .001$.

These results suggest that YBSM may be successfully implemented into a wellness program in a mental health care system. Study 1 limitations include lack of a control group and short-term follow-up.

Study 2

After demonstrating preliminary feasibility and efficacy of YBSM in Study 1, we implemented Study 2 to provide a more rigorous and comprehensive test of YBSM by comparing its effects to those of another stress-management program that has been shown to be effective. In this randomized trial, we added additional outcomes including additional physical and health behavior outcomes and a measure of burnout, all important sequelae of stress that could be affected by these interventions. These additional health measures provide a more comprehensive and holistic assessment of wellness and have been shown to provide invaluable and unique health information about well-being in previous research (e.g., Chae, Lee, Rifai, & Ridker, 2001). Additionally, including a measure of burnout has been shown to be important when examining workplace wellness and workplace intervention (e.g., Jacobson, 2008). Study 2 also examined longer-term treatment effects and included two longer-term follow-up assessments.

Method

Participants

Thirty-eight participants completed baseline questionnaires (YBSM = 19, CBSM = 19), 28 participants completed postintervention Time 2 questionnaires, 25 participants completed Time 3 2-month follow-up questionnaires, and 19 completed 6-month post-follow-up questionnaires. Based on *t* tests and chi-squared tests, drop-out participants did not differ significantly on any baseline variable from those who remained in the study. Groups did not differ significantly in attrition rate or demographic characteristic. Of the 38 participants who were recruited for the study, 84.2% were female, 94.7% were White, and the mean age was 44.6 years old ($SD = 6.2$). Participants reported a variety of political (55.2% Democrat) and religious affiliations (42.2% Christian, 34.2% Spiritual but not religious, 15.8% Jewish, 5.2% Agnostic/Atheist, 2.6% Buddhist).

Procedure

Frontline mental health care providers were recruited via informational fliers that were distributed throughout the Department of Psychiatry at a large regional hospital in New England. Flyers included a contact number for interested employees to contact research coordinators for more information. To determine eligibility, potential participants completed the Physical Activity

Readiness Questionnaire (PAR-Q; Canadian Society for Exercise Physiology, 2002), a 7-item questionnaire assessing individuals' ability to engage in exercise without risk. Only potential participants who answered *No* to all of the PAR-Q items were eligible to participate in this study. Employees who attested to meeting all eligibility requirements underwent an informed consent process.

Participants were directed to an online, secure website (Qualtrics) to complete the online survey assessments at each of the four study time points. Baseline survey assessments were completed within 3 days after completing informed consent. After completing baseline measures, participants were e-mailed their randomized group assignment (CBSM or YBSM) and information on the meeting time and place of the assigned group. Two 8-week sessions of the intervention were conducted with 20 participants; participants were randomized to one of the four treatment groups (two sessions of 20 participants each). These two sessions were conducted partly simultaneously, with a 4-week overlap in start date. The two YBSM teachers were certified Kripalu yoga instructors and the two CBSM leaders were licensed clinical psychologists with training in cognitive behavioral therapy. Both interventions lasted 8 weeks and assessments were made pre- and postintervention and at 2-month and 6-month follow-up. Participants received a small financial incentive (\$20) for their time spent completing each set of questionnaires.

Measures

Measures from Study 1 and also included in Study 2 include depression, anxiety, and stress (DASS-21), health-related quality of life (SF-12), and coping skills (MOCS-A). Additional physical and mental well-being measures added to Study 2 are listed below.

Heart rate, blood pressure, body mass index. Heart rate, blood pressure, height, and weight were measured by the research assistants at the hospital at each time point. Body mass index (BMI) was calculated by the researchers using height and weight.

Fruit and vegetable intake. Fruit intake and vegetable intake were assessed with short, focused assessments referring to the past week using the National Cancer Institute (NCI) fruit and vegetable screener. This measure is listed on the NCI website (Thompson & Byers, 1994). Scoring algorithms produced a single number of average daily fruit and vegetable intake and percent energy from fat. Both assessments have been used in large-scale and more focused studies and have demonstrated reasonable validity (Thompson et al., 2002).

Physical activity. The Paffenbarger Physical Activity Questionnaire assessed habitual physical activity levels over the past month, including informal activities of daily living (e.g., city blocks walked, stairs climbed), leisure-time activities, and formal exercise (PPAQ; Paffenbarger, Wing, & Hyde, 1978). Activity scores in Kcal/wk were calculated based on sum of calories expended

across durations and intensities of the different activities. The PPAQ has excellent reliability (Pereira, FitzGerald, & Gregg, 1997) and predictive validity (Harris, French, Jeffery, McGovern, & Wing, 1994) and has been shown to be sensitive to changes during interventions (Jeffrey et al., 1998).

Alcohol use. Participants reported their intake of alcohol in the past 2 weeks. Consumption was assessed in terms of quantity and frequency, as well as the number of binge drinking episodes, as recommended by Kushner, Sher, Wood, and Wood (1994). One drink was defined as one 12-oz bottle of beer, one 4-oz glass of wine, one 12-oz bottle of wine cooler, or 1-oz of liquor straight or in a mixed drink. This measure has been used successfully in many studies of alcohol use and shows good reliability and validity (e.g., Park, Armeli, & Tennen, 2004; Park & Levenson, 2002).

Tobacco use. Participants reported current smoking status, including how many cigarettes they smoked per day, a method of assessing cigarette smoking that are widely used and has demonstrated good validity in previous research (e.g., Welte et al., 2011).

Sleep disturbance. The NIH Patient-Reported Outcomes Measurement Information System (PROMIS) instrument for sleep disturbance (SD), short form (4 items), was used to assess sleep disturbance. Items were rated on a 5-point Likert-type scale. PROMIS instruments are reliable and well-validated (US Department of Health and Human Services, 2000).

Depression. In addition to the DASS-21 depression subscale, we administered the PHQ-9, which consists of nine items designed to assess symptoms of depression based directly on the diagnostic criteria for major depressive disorder in the *Diagnostic and Statistical Manual, Fourth Edition (DSM-IV)* (APA, 2000; Kroenke, Spitzer, & Williams, 2001). We removed the suicidality item because we were sampling a high-functioning population (Simon et al., 2013). The PHQ is widely used and has good psychometrics (Rathore et al., 2014).

Burnout, compassion satisfaction, secondary traumatic stress. The Professional Quality of Life scale (ProQol 5; Stamm, 2009) included 30 items that assessed burnout, compassion satisfaction, and secondary traumatization. The ProQol 5 has good psychometric qualities and has been widely used in mental health care provider populations (Stamm, 2009).

Results

Descriptive statistics

The two intervention groups were statistically similar to each other on most demographic baseline variables. However, the sample of mental health care providers was, on average, significantly less stressed than national norms (Table 2; Crawford & Henry, 2003). Additionally, maladaptive professional quality of life scores (compassion satisfaction [reverse scored], burnout, and secondary traumatic stress) were low compared to norms, but these published

Table 2. Comparison to national averages, *t*-tests.

	National norm means (<i>SD</i>)	Group means (<i>SD</i>)
Heart rate	80 (20)	CBSM: 68.10 (8.06) Yoga: 68.70 (10.01)
BMI	26.6 (7.61)	CBSM: 28.98 (6.21) Yoga: 27.56 (5.28)
Fruit	1.12 (.58)	CBSM: 2.83 (4.37)** Yoga: 2.18 (1.50)*
Vegetable	1.65 (.70)	CBSM: 1.22 (.52) Yoga: 1.37 (.50)
Exercise	31.2 (8.26)	CBSM: 41.2 (10.1) Yoga: 35.4 (12.2)
Alcohol amount	1.54 (1.12)	CBSM: 1.36 (1.22) Yoga: 2.46 (3.07)*
Alcohol binge	.32 (.22)	CBSM: .10 (.29)* Yoga: .31 (.63)
Tobacco use	20.6 (3.2)	CBSM: 4.8 (1.2)** Yoga: 11.1 (3.1)**
Sleep	5.25 (1.32)	CBSM: 2.70 (.30) Yoga: 2.66 (.31)
MCS	50	CBSM: 42.97 (6.25) Yoga: 42.29 (5.80)
PCS	50	CBSM: 48.61 (5.04) Yoga: 48.34 (6.54)
MOCS aware	2.26 (.09)	CBSM: 3.03 (.69) Yoga: 3.44 (.97)
MOCS cope	3.31 (.08)	CBSM: 3.29 (.58) Yoga: 3.32 (.81)
MOCS relax	2.81 (.21)	CBSM: 2.79 (.59) Yoga: 2.32 (.62)
DASS dep	3.18 (5.39)	CBSM: 4.26 (3.82) Yoga: 2.66 (3.10)
DASS anx	2.25 (7.48)	CBSM: 2.21 (1.69) Yoga: 1.89 (2.47)
DASS stress	5.16 (8.04)	CBSM: 6.68 (3.62) Yoga: 6.22 (3.51)
Compassion satisfaction	5 (1)	CBSM: 3.98 (.59) Yoga: 3.92 (.38)
Burnout	5 (1)	CBSM: 2.21 (.52)* Yoga: 2.32 (.41)*
Secondary traumatic stress	5 (1)	CBSM: 1.98 (.54)** Yoga: 1.85 (.48)**
Blood pressure	122 (23.1)	CBSM: 127 (2.8) Yoga: 131 (3.2)
PHQ-9	3.3 (3.8)	CBSM: 4.72 (1.70) [†] Yoga: 4.05 (1.75) [†]

Note. BMI = body mass index, MCS = Mental Health Composite Score of the SF-12, PCS = Physical Health Composite Score of the SF-12, MOCS = Measure of Current Status, DASS = Depression, Anxiety, and Stress Scale, PHQ-9 = Patient Health Questionnaire.

[†] $p < .10$, * $p < .05$, ** $p < .01$, *** $p < .001$.

averages were drawn from those “helping people who experience suffering and trauma,” suggesting the possibility that this measure was normed among those dealing with greater trauma than would frontline mental health care providers, as in the current sample (See Table 2; Stamm, 2009). The groups were slightly more depressed than national averages, at a trending significance

(YBSM $p = .086$, CBSM $p = .064$). Additionally, this sample smoked less than the national average, with only two smokers in the study (one per group).

YBSM participants attended an average of 6.43 sessions ($SD = 1.78$), and CBSM participants attended an average of 6.13 sessions ($SD = 1.86$), a difference that was not statistically significantly different.

Linear mixed modeling

We used linear mixed modeling to examine Time, Group, and Time by Group interactions for the YBSM and CBSM groups on all outcomes (see [Table 3](#)). Linear mixed modeling controls for missing data by estimation (REML). Unstructured, compound symmetry, and autoregressive (AR1) models were run for each outcome variable. -2 log likelihood, Akaike Information Criterion (AIC), and Bayesian Information Criterion (BIC) levels were compared in the context of parameter and chi-squared differences for all presented models to choose the best fitting model for each outcome, and presented data met acceptable levels for good model fit (Burnham & Anderson, 2002).

Time effects. A number of indices improved significantly in both groups over the 8-month course of the study at the $p = .05$ level, including fruit intake ($F = 2.98$, $p = .037$), vegetable intake ($F = 25.15$, $p < .001$), MOCS relaxation ($F = 9.93$, $p \leq .001$), MOCS awareness ($F = 8.32$, $p \leq .001$), and compassion satisfaction ($F = 762$, $p = .003$). Measures that decreased included depression, as measured by the DASS ($F = 5.58$, $p = .002$) and PHQ-9 ($F = 4.56$, $p = .004$), stress ($F = 7.89$, $p \leq .001$), heart rate ($F = 4.07$, $p = .018$), alcohol consumption (binging; $F = 1.87$, $p = .056$), and burnout ($F = 4.57$, $p < .001$).

Group effects. There were no main effects by group for any variable; there were, however, Time by Group interactions.

Time by Group interactions. There were significant Group by Time interactions, such that one group improved above and beyond another on measured indices over time. The CBSM group increased more on MOCS Coping Confidence ($F = 3.42$, $p < .05$; see [Figure 1](#)). The YBSM group increased significantly more than the CBSM group on self-reported physical activity ($F = 2.83$, $p < .05$; see [Figure 2](#)). The YBSM group also decreased on secondary traumatic stress ($F = 1.92$; see [Figure 3](#)) and increased on the SF-12 MCS ($F = 2.11$; see [Figure 4](#)) at the $p > .10$ level. All figures were created from estimated marginal means.

No change. There were no significant changes by group or over time in sleep quality, alcohol (total amount consumed), BMI, anxiety, cigarette smoking, or PCS.

Discussion

Study 2 showed that the CBSM and YBSM groups evidenced significant improvements in health behaviors (fruit and vegetable intake, alcohol

Table 3. Model summaries.

	Estimated marginal means (SE) T1, T2, T3, T4	F (p) Statistics			
		Intercept	Group	Time	Group × Time
Heart rate	CBSM: 68.10 (1.99), 66.36 (2.38), 69.78 (2.97), 64.50 (2.57) Yoga: 68.70 (1.99), 68.73 (2.29), 67.33 (2.57), 62.72 (2.65)	173.20	4.38 (.141)	4.07 (.018)*	4.12 (.122)
Blood pressure	CBSM: 122.10 (1.99), 124.36 (2.38), 132.78 (2.97), 122.50 (2.57) Yoga: 124.70 (1.99), 120.73 (2.29), 121.33 (2.57), 121.72 (2.65)	1186.32	.551 (.462)	3.32 (.025)*	2.09 (.108)*
BMI	CBSM: 21.54 (3.03), 22.18 (3.62), 23.69 (3.91), 21.48 (5.53) Yoga: 24.16 (3.03), 22.76 (3.62), 23.92 (4.29), 22.39 (3.91)	37.18	3.85 (.14)	.730 (.395)	1.70 (.192)
Fruit	CBSM: 2.83 (.67), 2.38 (.78), 2.65 (.87), 4.46 (.91) Yoga: 2.18 (.71), 1.91 (.78), 2.34 (.83), 3.98 (.91)	4.66	55(.46)	2.98 (.037)*	.132 (.94)
Vegetable	CBSM: 1.22 (.38), 2.11 (.44), 1.98 (.49), 5.71 (.52) Yoga: 1.37 (.40), 2.29 (.46), 2.16 (.48), 6.37 (.52)	2.98	80(.38)	25.15 (<.001)*	.128 (.94)
Exercise	CBSM: 40.55 (11.07), 50.19 (12.99), 122.00 (21.20), 47.00 (25.98) Yoga: 35.20 (16.43), 41.00 (13.88), 55.69 (13.88), 55.79 (13.88)	75.09	2.28 (.141)	4.42 (.011)**	2.83 (.046)*
Alcohol amt	CBSM: 1.35 (.57), 1.46 (.65), 1.22 (.71), 1.80 (.68) Yoga: 2.46 (.59), 2.22 (.72), 2.50 (.62), 2.72 (.65)	23.71	1.55(.22)	.34 (.799)	1.81 (.10)
Alcohol binge	CBSM: .08 (.24), 1.00 (.22), 0.0 (.28), .09 (.26) Yoga: .31 (.24), 1.00 (.22), .64 (.26), .60 (.27)	1.13	1.55(.22)	1.87 (.056)*	1.86 (.11)
Tobacco use	CBSM: .95 (.22), .87 (.34), 1.00 (.11), .91 (.30) Yoga: .89 (.32), 1.93 (.26), .92 (.28), 1.00 (.10)	1.13	1.55(.22)	.87 (.213)	.85 (.43)
Sleep	CBSM: 21.35 (1.21), 21.29 (1.34), 20.8 (1.58), 20.82 (1.51) Yoga: 20.00 (1.24), 21.67 (1.44), 20.36 (1.51), 20.2 (1.58)	1085.99	.165 (.68)	.311 (.817)	.158 (.924)
MCS	CBSM: 37.51 (2.73), 44.14 (3.27), 43.64 (3.53), 33.10 (5.00) Yoga: 41.23 (2.73), 40.84 (3.27), 43.40 (3.87), 46.62 (3.53)	768.50	.984 (.330)	1.08 (.376)	2.11 (.048)*
PCS	CBSM: 47.54 (3.03), 45.18 (3.62), 43.69 (3.91), 54.48 (5.53) Yoga: 40.16 (3.03), 40.76 (3.62), 48.92 (4.29), 37.39 (3.91)	837.18	3.85 (.06)	.630 (.601)	2.70 (.061)
MOCS aware	CBSM: 3.03 (.17), 3.64 (.20), 3.58 (.22), 3.49 (.23) Yoga: 3.44 (.18), 3.87 (.20), 4.09 (.21), 3.49 (.23)	1209.34	.457 (.503)	8.32 (<.001)***	2.77 (.063)
MOCS relax	CBSM: 3.29 (.15), 3.56 (.17), 3.50 (.20), 3.88 (.20) Yoga: 3.32 (.16), 3.45 (.17), 3.85 (.19), 3.46 (.20)	1110.34	.457 (.503)	3.99 (.011)*	2.77 (.072)
MOCS cope	CBSM: 3.29 (.15), 3.56 (.17), 3.50 (.20), 3.88 (.20) Yoga: 3.32 (.16), 3.45 (.17), 3.85 (.19), 3.46 (.20)	1127.36	.489 (.489)	4.303 (.014)*	3.42 (.038)*

PHQ-9	CBSM: 4.26 (.63), 1.80 (.71), 2.50 (.80), 1.92 (.83) Yoga: 2.67 (.65), 1.64 (.74), 1.23 (.77), 1.00 (.83)	45.22	1.32(.26)	4.56 (.004)**	.466 (.71)
DASS depression	CBSM: 4.26 (.63), 1.80 (.71), 2.50 (.80), 1.92 (.83) Yoga: 2.67 (.65), 1.64 (.74), 1.23 (.77), 2.00 (.83)	45.22	1.32(.26)	5.58 (.002)**	.466 (.71)
DASS anxiety	CBSM: 2.21 (.47), 1.73 (.53), 1.50 (.59), 1.63 (.62) Yoga: 1.89 (.48), 1.60 (.55), 2.15 (.57), 1.64 (.62)	1122.57	.003 (.957)	1.58 (.232)	1.51 (.236)
DASS stress	CBSM: 6.68 (.74), 3.80 (.83), 4.00 (.93), 3.54 (.97) Yoga: 6.22 (.76), 5.12 (.86), 5.46 (.90), 3.67 (.97)	112.57	.003 (.957)	7.89 (.001)***	1.51 (.236)
Compassion satis	CBSM: 3.99 (.13), 4.08 (.14), 3.98 (.16), 3.84 (.17) Yoga: 3.93 (.13), 4.00 (.14), 4.21 (.15), 4.16 (.17)	2555.41	.243 (.625)	7.62 (.003)**	.651 (.590)
Burnout	CBSM: 2.20 (.10), 3.08 (.11), 2.92 (.12), 3.14 (.13) Yoga: 2.32 (.10), 3.18 (.11), 3.21 (.12), 3.13 (.13)	2650.82	142 (.244)	4.57 (<.001)***	.261 (.853)
Secondary traumatic stress	CBSM: 1.98 (.11), 1.66 (.12), 1.71 (.13), 1.66 (.14) Yoga: 1.86 (.11), 1.81 (.12), 1.55 (.13), 1.63 (.14)	639.02	.001 (.971)	9.476 (<.001)***	1.92 (.096)*

Note. BMI = body mass index, MCS = Mental Health Composite Score of the SF-12, PCS = Physical Health Composite Score of the SF-12, MOCS = Measure of Current Status, DASS = Depression, Anxiety, and Stress Scale, PHQ-9 = Patient Health Questionnaire.

* $p < .05$, ** $p < .01$, *** $p < .001$.

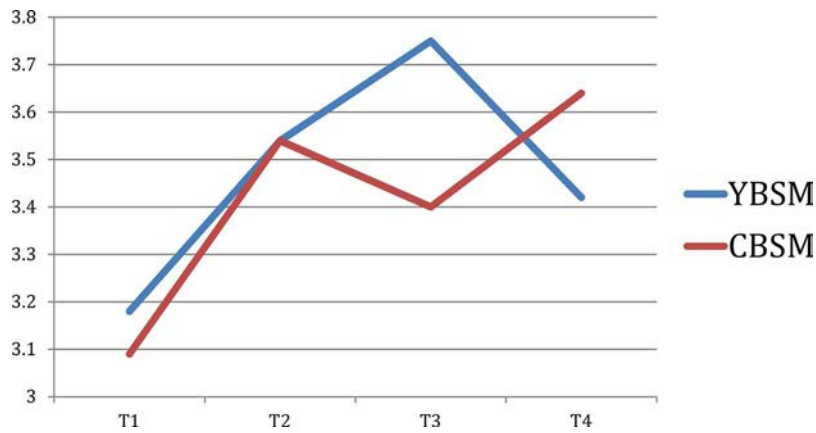


Figure 1. Time by Group interaction, MOCS coping confidence. *Note.* YBSM = Yoga Based Stress Management, CBSM = Cognitive Behavioral Stress Management.

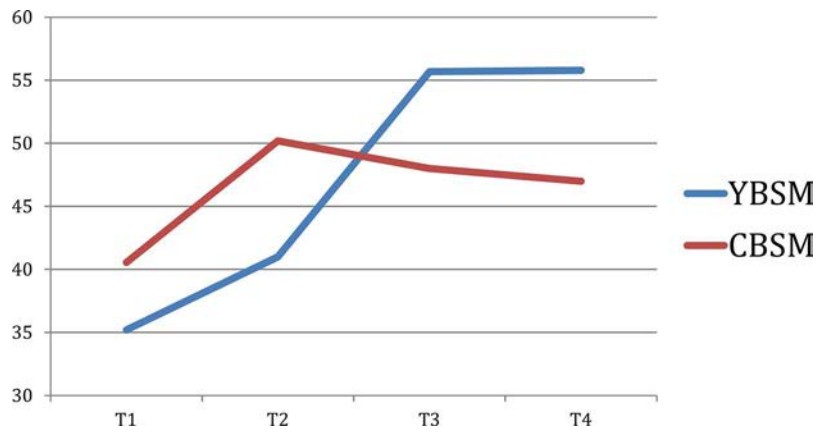


Figure 2. Time by Group interaction, PAFF. *Note.* YBSM = Yoga Based Stress Management, CBSM = Cognitive Behavioral Stress Management.

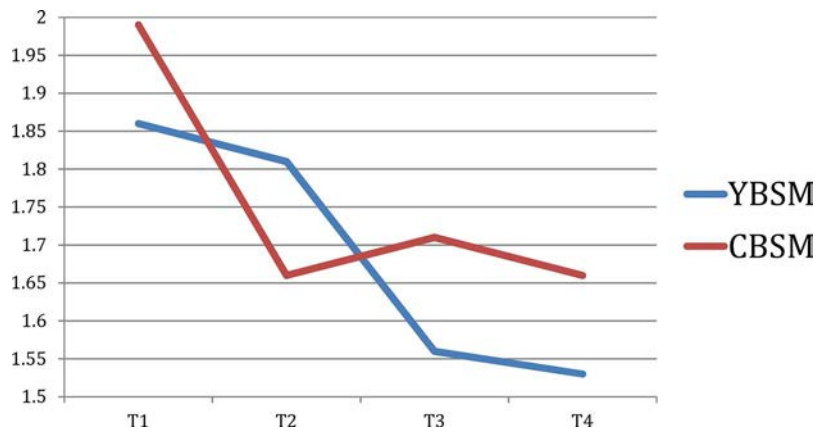


Figure 3. Time by Group interaction, PROQOL secondary traumatic stress. *Note.* YBSM = Yoga Based Stress Management, CBSM = Cognitive Behavioral Stress Management.

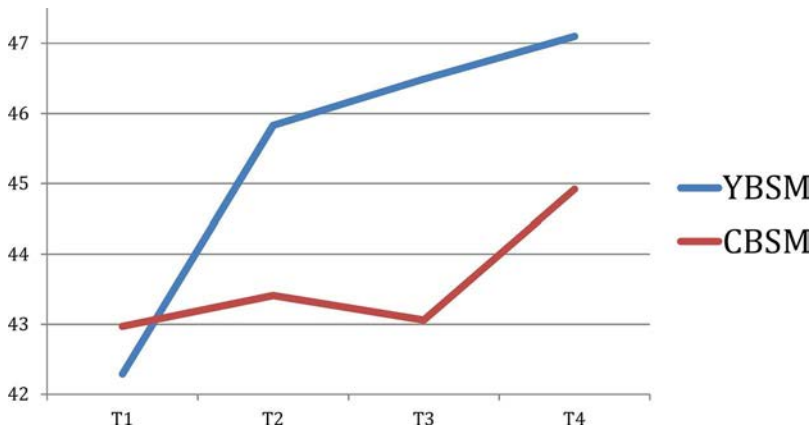


Figure 4. Time by Group interaction, MCS mental health. *Note.* YBSM = Yoga Based Stress Management, CBSM = Cognitive Behavioral Stress Management.

binging) and physical (decreased heart rate) health. Many improvements in mental health for both groups were also observed, including relaxation and awareness, professional quality of life (i.e., compassion satisfaction and burn-out), depression, and stress. These findings indicate that two diverse programs that target the shared mechanism of stress management yield similarly beneficial effects on health.

Despite these similarities, differences between the group outcomes suggest important differential contributions or mechanisms of action between YBSM and CBSM. Although the CBSM intervention appeared more effective at improving participants' confidence in their ability to cope, YBSM was more effective at increasing nonyoga self-reported physical activity, mental health-related quality of life, and decreasing secondary traumatic stress. Given that the YBSM intervention included stress management psychoeducation as well as yogic techniques and practices, differential effects between the two groups suggest that the effects of yoga practice may be particularly salient in fostering the latter improvements. For example, yoga may act as a gateway to other exercise, helping individuals find a sense of comfort and ease in their physical body that may attenuate exercise avoidance, increase awareness of endogenous needs for movement, and foster enhanced engagement in physical movement. These findings also align with prior evidence linking yoga practice to improved mental health (e.g., Uebelacker et al., 2010), including post-traumatic stress disorder (PTSD) symptoms (Dick, Niles, Street, & DiMartino, & Mitchell, 2014); such findings suggest the embodied nature of the practice may exert additive mechanisms of action beyond those deployed in CBSM.

Finally, no changes in either group were observed for sleep quality, alcohol (total amount consumed), BMI, anxiety, tobacco use, and physical health-related quality of life. The lack of change in these variables is difficult to explain, particularly given prior work documenting consistent improvements

in these factors following stress management interventions (e.g., Lee et al., 2007). Although some studies have suggested that yoga may facilitate weight loss (Rioux, Thomson, & Howerter, 2014), the brief amount of time spent in yoga during this 8-week YBSM intervention may have blunted our ability to detect change in BMI. Change in BMI has not, to our knowledge, been assessed following CBSM previously. The lack of findings here suggests that alterations in BMI do not occur following these stress management interventions, though future research should examine outcomes over a longer time period. The null findings for tobacco intake were likely attributable to the low base rate of smoking, with only two smokers in the sample. Change would thus have been difficult to detect.

Study 2 has a number of strengths and limitations. This is the first published study to examine the comparative effectiveness of YBSM and a strong CBSM program on physical, mental, and behavioral health outcomes. However, important considerations follow. Yoga itself is a health behavior and, for sustained benefits, continued practice may be necessary. CBSM, conversely, teaches a set of skills that, once retained, are at least theoretically, permanent, without continued instruction. Finally, a meta-analysis of occupational stress management interventions found cognitive-behavioral interventions to consistently produce larger effects than interventions characterized as relaxation, organizational, multimodal, or alternative in nature (Richardson & Rothstein, 2008). Given that CBSM improved only coping skills above and beyond YBSM in this study, continued investigation of their differential effectiveness seems important.

Given the high-stress environments that frontline mental health care providers face, the improvements noted in compassion satisfaction and both components of compassion fatigue—burnout and secondary traumatization—are particularly noteworthy. Maintaining and bolstering frontline providers' welfare is critical, given the influence of their well-being on the patients they care for. The present results suggest that a brief intervention provided in the workplace can substantially improve their functioning. Such results are promising and suggest that mental health treatment facilities should consider implementing and evaluating stress management programs such as YBSM as part of their efforts to promote good patient care as well as to promote employee wellness.

General discussion

The observed results suggest that YBSM and CBSM are beneficial in promoting myriad aspects of health and well-being among frontline mental health providers, that are feasible interventions for inclusion in workplace wellness interventions, that the YBSM intervention proved efficacious compared to the well-studied and well-supported CBSM intervention, and that each had important and somewhat different effects.

The YBSM intervention was rated as enjoyable and useful. Previous studies have pointed to high attendance and retention rates in the CBSM study as speaking to the “extremely high satisfaction rates” (Lechner et al., 2012). Although we did not assess for perceived satisfaction ratings in Study 2, we did compare number of sessions attended. Although YBSM participants attended on average slightly more sessions, compared to CBSM participants, the difference was not statistically significantly different. With the growing popularity of yoga (Castenada, 2014), and the decreasing popularity of more traditional in-person stress management interventions in the workplace (e.g., Eisen et al., 2008), it may be that more mental health care workers would be likely to attend a yoga class than a stress management class. It will be important to determine the likelihood of an offered stress management class (YBSM, CBSM, or other) in drawing participants within the workplace in a future study.

These studies also demonstrate preliminary efficacy for the YBSM intervention as a novel and useful intervention that produces similarly beneficial effects as the well-supported CBSM intervention, while providing some benefits above and beyond CBSM, including increased physical activity, increased health-related quality of life, and decreased secondary traumatic stress. CBSM does seem to provide an added benefit in terms of coping skills. If improved coping skills are a target of the intervention, perhaps the YBSM protocol could be slightly modified to include more discussion of coping skills, an idea awaiting future research.

As mentioned previously, it is important to interpret the generalizability of these preliminary findings with caution, as the sample size was small, limiting statistical power to detect change, and as the participant pool was limited to two hospital systems in one geographic area. Therefore, inferences around outcomes should be made with the utmost caution. More research with larger sample sizes is needed for confirmation and replicability of these findings.

However, both interventions, including the new YBSM intervention, seem to suggest efficacy with regards to mental health care professionals, a non-clinical yet stress-prone population. These interventions may be useful for other similar populations such as other health care providers and first responders.

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Appendix

Outline of CBSM and YBSM interventions.

	CBSM (developed by Antoni et al., adapted with permission; for more information please contact mantoni@miami.edu)	YBSM (developed by the Kripalu Institute for Extraordinary Living; for full intervention manual contact Edi Pasalis; EdiP@kripalu.org)
Week 1	Introduction to program, stress awareness/physical response, 8 muscle group progressive muscle relaxation (PMR)	Introduction to program, Introduction to Complete breath, 40 minutes of yoga flow
Week 2	Stress awareness and appraisal processes, diaphragmatic breathing	Self-observation without judgment, body scan, 45 minutes of yoga
Week 3	Automatic thoughts, deep breathing and counting, passive PMR, special place imagery	Depletion and renewal discussion, self-reflective journaling exercise, 45 minutes of yoga practice
Week 4	Rational thought replacement, autogenic training, coping part 1	Riding the wave stress management discussion and practice, 45 minutes of yoga: breathe, relax, feel, watch, and allow
Week 5	Coping part 2, patterns of coping, light meditation	Tools for renewal discussion, 45 minutes of yoga, alternate nostril breathing, seated meditation, one-word integration
Week 6	Social support, anger management, color meditation	Working with resistance discussion (awareness, acceptance, and adjustment of goals), 45 minutes of yoga: Exploring the core
Week 7	Assertiveness training, mantra meditation	Loving kindness meditation, 45 minutes of yoga: heart opening yoga poses, guided visualization, and discussion of social connection
Week 8	Review of course, monitor your thinking, imagery exercise	Review of course, 45-minute yoga class, reflective journaling, creating realistic intentions

Note. Yoga Based Stress Management, CBSM = Cognitive Behavioral Stress Management.