

ORIGINAL RESEARCH

Psychosomatic and Physical Well-Being Factors After Mind-Body Interventions in a Hospital Setting

Bijoyaa Mohapatra, PhD; Rebecca Shisler Marshall, PhD

ABSTRACT

Context • Mind-body interventions encompass a variety of treatments that directly affect health. Researchers have found that yoga can decrease symptoms of depression and anxiety as well as improve dietary patterns, enhance physical function and capacity, and enrich sleep. Research has shown that mindfulness can have psychological and physiological benefits and treat symptoms of anxiety and depression.

Objective • This study intended to compare the benefits of 2 mind-body interventions—yoga and mindfulness—in a hospital setting.

Design • The research team performed a retrospective analysis of outcome data obtained from a hospital's programs.

Setting • The study took place at a mind-body center at a hospital in Athens, GA (USA).

Participants • Participants were 46 individuals enrolled either in a yoga ($n = 24$) or a mindfulness ($n = 22$) intervention program at the hospital.

Intervention • Participants self-selected a mind-body-intervention program offered at the hospital: yoga or mindfulness. They received guided training in their chosen intervention at weekly 2-h sessions for 6 to 9 wk.

Outcome Measures • Participants completed measures of anxiety, depression, mindfulness, and quality of life at 2 points during the mind-body programs, at baseline and

postintervention. The programs used the Beck Anxiety Inventory (BAI), Beck Depression Inventory-II (BDI-II), Freiburg-Mindfulness Inventory (FMI), Automatic Thought Questionnaire (ATQ), and RAND 36-Item Short Form Health Survey (SF-36).

Results • The results showed significant decreases between baseline and postintervention in depression (on BDI-II) and anxiety (on BAI) levels for participants in both groups; however, only participants in the mindfulness group showed significant increases in mindfulness (on FMI) and quality of life and decreases in the frequency of negative thoughts (on ATQ) and significant improvements in some health-related measures (on SF-36; all $P < .05$). However, a significant difference between the groups existed at postintervention only for limitations due to physical health on the SF-36.

Conclusions • The overall findings suggest that both the programs are effective. Although significant differences existed between the groups only for limitations due to physical health, the significant increases in categories other than anxiety and depression for the mindfulness group suggest that mindfulness can offer a more encompassing intervention for improving psychosomatic well-being, although further research is needed. (*Adv Mind Body Med.* 2019;33(3):4-11.)

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INTRODUCTION

The National Center for Complementary and Integrative Health (NCCIH) of the National Institutes of Health (NIH) defines *complementary and alternative medicine* (CAM) as “a group of diverse medical and healthcare systems, practices, and products that are not presently considered to be part of conventional medicine.”¹ These nonmainstream practices may be used in conjunction with or in place of conventional medicine and are known as complementary or alternative practices, respectively.

Between 2002 and 2007, a National Health Interview Survey (NHIS) estimated that CAM practices in the United

States have increased, with greater use by adults for acupuncture, deep-breathing exercises, massage therapy, meditation, naturopathy, and yoga.² In addition, in 2007, almost 4 in 10 US adults used nonvitamin and nonmineral natural products, and deep breathing exercises.

In another report, CAM health approaches—primarily yoga, tai chi, and qi gong—showed a 3.5% growth in use in men, 3.0% in women, and 8.4% in persons aged 65 y and older.³ In 2003, Davis and Darden⁴ found that US children showed low CAM usage, at 1.8%, with a rise to 3.5% in the adolescent years.⁴ Barnes et al² reported that 1 in 9 children in the United States used CAM therapy as of 2008, and they were more likely to use biologically based therapies, mind-body therapies, or manipulative body-based therapies as opposed to alternative medical systems.²

Although CAM's structure and classification varies, NCCIH divides it into 5 categories: alternative medical systems, mind-body interventions, biologically based treatments, manipulative and body-based methods, and energy therapies.⁵ Although mind-body interventions may be applied to a wide range of conditions, stress and anxiety are commonly studied by researchers. Modern society requires high external demands, causing the body to be in constant fight-or-flight mode. Psychological stress has been linked to a decrease in immune-system function, whereas anxiety has been associated with coronary heart disease, decreased quality of life, and suicidal behavior.⁶ Occupational stress has also led to an antagonistic state between mind and body, adversely affecting the link between the two.⁷ Controlling and being aware of how to cope with an overactive mind is a skill that might improve health outcomes.⁸ To overcome stress and anxiety, the most popular mind-based techniques are meditation, yoga, and deep breathing, specifically mindfulness-based stress reduction programs (MBSR), mindfulness-based cognitive therapy (MBCT), and yoga.²

To ensure physical well-being and mind-body balance, yoga practices include controlled breathing (*pranayama*), postural exercises (*asana*), and meditation (*dhyana*). Several researchers have reported decreases in symptoms of depression and anxiety in participants after yoga practice.^{9,10} The literature suggests that alternative practices such as yoga are associated with stress changes^{11,12}; however, the neurological, biological, and physiological mechanisms underlying such changes are still not clearly understood. Yoga has been linked to restoring balance in the autonomic nervous system (ANS) by decreasing the activity of the sympathetic nervous system (SNS) and increasing that of the parasympathetic nervous system (PNS) while obtaining a meditative state of relief from anxiety.¹³

Yoga practices have also been found to decrease vagal tone and reduce PNS activity by switching from fast breathing to slow breathing and decreasing oxygen consumption, heart rate, and blood pressure. This is thought to calm the mind and bring a sense of control of the body.¹⁴ Streeter et al¹⁵ observed that reduced gamma-aminobutyric acid (GABA)

levels may be associated with stress and that yoga counteracts this issue by inhibiting the hypothalamic–pituitary–adrenal (HPA) system. Some studies have shown that yoga can decrease the levels of salivary cortisol^{16,19} and improve resting heart rate variability (HRV) and blood pressure, a sign of SNS activation.²⁰⁻²³ In another study, conducted in individuals older than 45 years with cardiovascular-disease risk, examined the effects of an 8-week yoga program and showed improvements in dietary patterns, enhancements in physical function and capacity, enriched sleeping, and reductions in stress and anxiety levels.²⁴ Overall, yoga practice is not only used for improving health conditions but also for maintaining health and disease prevention.^{25,26}

In contrast to yoga, mindfulness practices focus on establishing a stable pattern of psychophysiological behavior, including thoughts, feelings, mindful awareness, actions, and behaviors. Research has shown that mindfulness skills can have psychological and physiological benefits and treat symptoms of anxiety and depression in a range of clinical and nonclinical populations, including pain, cancer, heart disease, depression, and anxiety.^{27,28} Psychological benefits involve enhanced self-awareness and self-regulation, improved attention and concentration, mental clarity, cognitive flexibility, and interprofessional and intraprofessional benefits. Physiological benefits include improvements in immune system functioning, decreases in salivary cortisol, increases in cerebral blood flow, balances in the workload activity between the brain's 2 hemispheres, increases in overall cortical activity, and increases in rapid-eye-movement sleep.²⁹ Furthermore, several other reviews have documented that programs such as mindfulness-based stress reduction (MBSR) can reduce symptoms of stress, anxiety, and depression, and increase levels of health and well-being across clinical and nonclinical population.^{20,28-32}

The current study's focus was on mind-body interventions and the potential physical and emotional benefits of those practices. The research team compared the benefits that 2 mind-body interventions—yoga and mindfulness—can have in reducing levels of perceived stress and anxiety while improving psychosomatic and physical well-being.

METHODS

Participants

The study was a retrospective analysis of outcomes from individuals who participated in mind-body interventions at a mind-body center in a hospital in Athens, Georgia (United States). Personnel at the center routinely collect data on participants' performance in the mind-body programs through the measures discussed in the current study.

All participants were from the local community and between the ages of 24 and 66 years. None of the participants had any prior knowledge of or had practiced any of the CAM procedures before enrolling in the training program.

Table 1 provides information about the general characteristics of all participants enrolled in the intervention

Table 1. Demographics of Participants Enrolled in Yoga and Meditation Intervention Programs

	Yoga Group <i>n</i> = 24 <i>n</i> (%)	Mindfulness Group <i>n</i> = 22 <i>n</i> (%)	<i>P</i> Value
Age, y, mean ± SD	54.58 ± 10.85	51.61 ± 2.34	.668
Gender			
Male	5 (21%)	6 (27%)	.842
Female	19 (79%)	16 (73%)	.652
Education, y, mean ± SD	16.35 ± 0.44	18.16 ± 0.61	.014 ^a
Program Duration, wk, mean ± SD	6.79 ± 1.78	8.92 ± 2.74	.322
Race			
White	24 (100%)	21 (95%)	.781
White, Hispanic, other	0 (0%)	1 (5%)	.374
Relationship Status			
Married	17 (71%)	14 (63%)	.774
Divorced	5 (21%)	2 (9%)	.101
Widowed	2 (8%)	0 (0%)	.374
Cohabiting	0 (0%)	3 (14%)	.158
Unanswered	0 (0%)	3 (14%)	.374
Employment Status			
Working full time	10(42%)	12 (55%)	.806
Working part time	7 (29%)	5 (23%)	.519
Unemployed	5 (21%)	4 (18%)	.854
Retired	1 (4%)	1 (4%)	.999
On disability	1 (4%)	0 (0%)	.374
Income			
\$10 000 to \$20 000	3 (13%)	1 (4%)	.374
\$20 000 to \$30 000	3 (13%)	0 (0%)	.158
\$30 000 to \$40 000	2 (8%)	2 (9%)	.999
\$40 000 to \$50 000	4 (16%)	0 (0%)	.205
\$50 000 and up	12 (50%)	19 (87%)	.410

^a*P* < .05; approximate percentages are provided in brackets.

Abbreviations: SD, standard deviation.

programs. No significant differences existed at baseline between the individuals in the 2 groups in terms of age, gender, or overall program duration. A significant difference did exist between the groups for education level (*P* = .014). For all other descriptors (race, relationship status, employment status, and income) there were no significant differences between the groups.

Only individuals who completed the respective courses as well as the baseline and postassessment measures were included in the study. No other inclusion or exclusion criteria existed. Due to the retrospective nature of the study,

data were not available regarding those who did not complete the courses or the evaluations.

Procedures

The hospital’s mind-body center offers 2-hour sessions of yoga and mindfulness as part of its regular programmatic content. Participants self-selected a mind-body intervention program offered at the hospital: yoga or mindfulness. They received guided training in their chosen intervention at weekly 2-hour sessions for 6 to 9 weeks.

Interventions

Yoga. Yogic practices are a blend of low-intensity, slow-paced movements, deep and focused breathing, and guided-meditation techniques that focus either on nonclinical or clinical populations that live with chronic illness or injury, specifically in aging populations.^{24,33-35} The yoga program focuses on dissolving stress by increasing physical balance, flexibility, and strength; providing a sense of wellness and inner peace; and simultaneously calming the mind and nervous system.

The yoga poses included the *Vajrasana* (thunderbolt pose), *Sukhasana* (easy pose), *Bhujangasana* (cobra pose), *Cakravakasana* (cat pose), *Balasana* (child's pose), and *Utkatasana* (chair pose). Each session is structured by the instructor and includes 10 minutes of warm-up and cool-down, 10 to 20 minutes of guided breathing and meditation, and 35 to 40 minutes of yoga poses.

Mindfulness. Mindfulness primarily targets behavioral health problems and mental disorders and has been shown to significantly reduce anxiety and depression, mood disturbances, and somatic symptoms of stress in various populations.^{7,20,36-40} It refers to a form of therapy that aids in preventing the relapse of depression by combining mindfulness techniques—meditation, breathing exercises, and stretching—with education to help break the negative-thought patterns that are characteristic of recurrent depression. The mindfulness approach encourages participants to change their relationship to thoughts, feelings, and body sensations. Individuals learn to engage with thoughts in a different way, as fleeting events in the mind and the body that they can choose to engage with or not and with regular practice can break the old association between negative mood and thinking that would normally trigger a relapse.⁴¹ The mindfulness group in the current study combined meditation, breathing exercises, and cognitive thinking in their program.

Outcome Measures

Participants completed measures of anxiety, depression, mindfulness, and quality of life at 2 points during the mind-body programs, at baseline and postintervention. The programs use the Beck Anxiety Inventory (BAI), Beck Depression Inventory-II (BDI-II), Freiburg-Mindfulness Inventory (FMI), Automatic Thought Questionnaire (ATQ), and RAND 36-Item Short Form Health Survey (SF-36). All measures are valid, reliable, and self-report scales.

Beck Anxiety Inventory. This inventory is a well-accepted, 21-item, self-reported measure of anxiety in adults and adolescents. Because the items in the BAI describe the emotional, physiological, and cognitive symptoms of anxiety, it can discreetly discriminate anxiety from depression.⁴² Each item is rated on a Likert scale ranging from 0 (not bothered by the symptom) to 3 (severely bothered by the symptom). The total score on the test can range from 0 to 63, and a score of 30 and above indicates severe anxiety.

Beck Depression Inventory-II. This inventory is a 21-item, self-reported inventory that measures characteristic

attitudes and symptoms of depression and that taps into psychological and somatic behaviors following a 2-week, major depressive episode.^{43,44} Each item is rated for four possible responses of increasing intensity (0 indicating less intense problems and 3 indicating more intense problems). The total score on the test can range from 0 to 63, and a score of 29 and above indicates severe depression.

Freiburg-Mindfulness Inventory. This inventory is a 14-item scale that measures the concept of mindfulness as either an outcome of an intervention or as a moderating variable, a personality trait. The inventory discriminates between novice and expert meditators.⁴⁵ The items are rated on a Likert scale ranging from 1 (rarely experienced mindfulness) to 4 (almost always experienced mindfulness). Higher total scores indicate increased level of mindfulness.

Automatic Thought Questionnaire. This scale is a 30-item questionnaire developed to identify and assess the frequency of automatic negative self-statements that are linked to depression.⁴⁶ Each item represents a negative thought, and the respondent must rate how often that thought has surfaced in the week prior to the questionnaire's completion, on a scale from 1 = not at all to 5 = all the time. A higher total score indicates a high level of automatic negative self-statements.

RAND 36-Item Short Form Health Survey. This questionnaire is a health survey that includes quality-of-life measures and is categorized into 8 health concepts: physical functioning, bodily pain, role limitations due to physical health problems, role limitations due to personal or emotional problems, emotional well-being, social functioning, energy/fatigue, and general health perceptions.⁴⁷ The items are rated on different rating scales: some are rated from excellent to poor, some rated on yes/no questions and others on a Likert scale ranging from 1 (experience it all the time) to 6 (experience it none of the time). The total scores can range from 0 to 100 where lower scores indicate more disability.

Statistical Analysis

Data from self-reported rating scales were subjected to nonparametric statistical analyses. Paired samples *t* tests were used to study the changes within the 2 groups throughout the period—baseline compared with postintervention, and independent samples *t* test were used for intergroup comparisons—yoga compared with mindfulness. A *P* value of less than .05 was considered statistically significant.

RESULTS

Retrospective data from 46 participants were analyzed (Table 2). The yoga group included 24 participants, and the mindfulness group included 22 participants.

The yoga group showed significant reductions between baseline and postintervention only in anxiety, *P* = .007, and depression, *P* = .031 (Figure 1). In comparison, the

Table 2. Intergroup and Intragroup Comparisons of Outcome Measures for the Yoga ($n = 24$) and Mindfulness ($n = 22$) Groups Over the Intervention Period

		Baseline Mean ± SD	Postintervention Mean ± SD	P Value
BAI	Yoga	11.409 ± 7.456	7.682 ± 5.286	.007 ^b
	Mindfulness	13.286 ± 12.673	8.762 ± 7.974	.048 ^b
BDI-II	Yoga	8.134 ± 4.874	6.134 ± 5.429	.031 ^b
	Mindfulness	8.306 ± 6.387	4.722 ± 4.012	.001 ^b
FMI	Yoga	84.762 ± 15.290	87.119 ± 14.191	.192
	Mindfulness	75.725 ± 10.525 ^a	89.10 ± 13.322	.000 ^b
ATQ				
Frequency	Yoga	45.5 ± 16.989	41.444 ± 14.193	.263
	Mindfulness	55.667 ± 25.9	46.667 ± 17.567	.009 ^b
Degree of Belief	Yoga	43.469 ± 15.977	48.813 ± 29.919	.503
	Mindfulness	53.353 ± 25.365	52.000 ± 26.641	.862
SF-36				
Physical Functioning	Yoga	76.50 ± 21.86	78.08 ± 20.88	.361
	Mindfulness	85.91 ± 16.30	86.82 ± 16.94	.657
Limitations Due to Physical Health	Yoga	56.25 ± 45.59	58.33 ± 45.25	.796
	Mindfulness	72.50 ± 34.32	85.00 ± 30.78 ^a	.047 ^b
Bodily Pain	Yoga	63.906 ± 23.106	68.667 ± 21.294	.266
	Mindfulness	73.296 ± 20.592	72.432 ± 23.588	.847
General Health	Yoga	61.83 ± 20.09	63.13 ± 19.33	.642
	Mindfulness	66.82 ± 17.22	68.77 ± 22.08	.337
Limitations Due to Emotional Problems	Yoga	66.67 ± 40.53	69.45 ± 37.97	.723
	Mindfulness	63.34 ± 38.85	83.34 ± 29.62	.007 ^b
Vitality	Yoga	47.08 ± 17.56	54.58 ± 14.81	.059
	Mindfulness	46.14 ± 23.60	54.43 ± 21.07	.012 ^b
Mental Health Perceptions	Yoga	69.00 ± 16.69	74.67 ± 13.74	.107
	Mindfulness	63.45 ± 18.03	74.36 ± 11.49	.001 ^b
Social Functioning	Yoga	72.92 ± 25.98	77.60 ± 24.45	.362
	Mindfulness	78.41 ± 21.88	83.81 ± 20.29	.270

^aIndicates significant differences between the yoga and mindfulness groups, $P < .05$.

^bIndicates significant differences between baseline and postintervention for a group, $P < .05$.

Abbreviations: SD, standard deviation; BAI, Beck Anxiety Inventory; BDI-II, Beck Depression Inventory-II; FMI, Freiburg-Mindfulness Inventory; ATQ, Automatic Thought Questionnaire; SF-36, RAND 36-Item Short Form Health Survey.

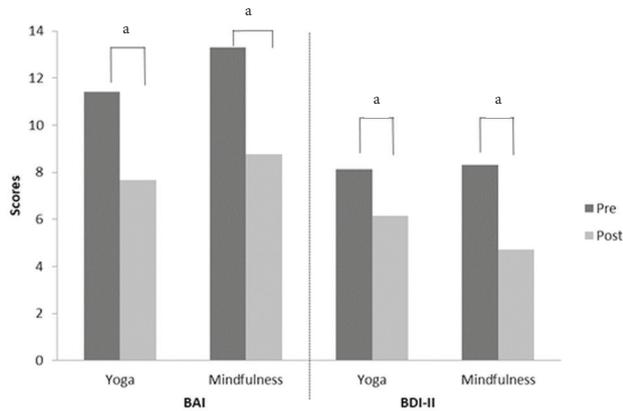
mindfulness group demonstrated significant reductions in anxiety, $P = .048$ and depression, $P = .001$, significant improvements in mindfulness, $P < .001$; significant decreases in the frequency of negative thoughts, $P = .009$; and significant improvements in some health-related measures. The measures included fewer limitations due to physical health, $P = .047$, and to emotional problems, $P = .007$; increases in vitality, $P = .012$; and changes in mental health perceptions, $P = .001$ (Figure 2).

However, a significant difference between the groups existed postintervention only for limitations due to physical health, as shown on the SF-36.

DISCUSSION

Mind-based interventions not only have few risks, but they can also be easily taught in a hospital environment, with beneficial changes observed. Most recent studies have found evidence of the effectiveness of these approaches, specifically

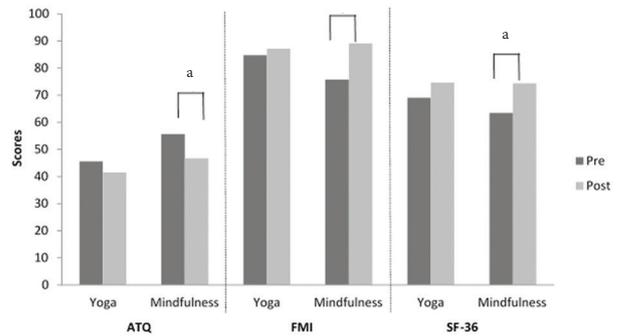
Figure 1. Scores at Baseline and Postintervention on Anxiety and Depression Scales for Yoga and Mindfulness Training



^aDenotes significance.

Abbreviations: BAI, Beck Anxiety Inventory; BDI-II, Beck Depression Inventory-II.

Figure 2. Scores at Baseline and Postintervention on Negative Thought, Mindfulness, and Quality of Life Scales for Yoga and Mindfulness Training.



^aDenotes significance.

Abbreviations: ATQ, Automatic Thought Questionnaire, frequency of negative thoughts; FMI, Freiburg-Mindfulness Inventory; SF-36, RAND 36-Item Short Form Health Survey, mental health perceptions.

on the topic of positive effects on psychological functioning and physical well-being. As a result, the use of mind-based interventions in different settings—such as medical setups, businesses, schools, and public-sector institutions—has gained popularity.

The current study explored the potential benefits of yoga versus mindfulness interventions and compared participant’s self-reported ratings on psychosomatic and physical well-being obtained at baseline and postintervention.

Significant reductions occurred for both groups for depression, as shown on the BDI-II, and for anxiety, as shown on the BAI. For the yoga group, these results are consistent with results from other studies.⁹ In a study by Kjellgren et al,¹⁰ healthy volunteers who participated in a 6-day intensive training program of yoga (*Sudarshan Kriya*) reported less anxiety, depression and stress, and increase in optimism with comparison to the control group who practiced only relaxation with gentle attention on breathing. Female participants in another study who self-identified themselves as emotionally distressed reported significant improvements in perceived stress, anxiety, vigor fatigue, and depression after participating in a 3-month *Hatha* yoga program. They even reported significant improvement in their physical well-being and overall reduction in pain in their head and back. This also correlated with decrease in salivary cortisol (a biological marker of stress reduction). Similar physiological response (decrease in cortisol level) was also observed in healthy college students who practiced *Hatha* yoga in a 90-minute class period.¹⁹ Huang et al²² also found that a single episode of *Hatha* yoga could have similar beneficial effects as long term training, and resulted in significant reduction in perceived stress in a group of female community residents.

The mindfulness group, however, showed significant changes on other scales: (1) increases in mindfulness, as shown on the FMI; (2) decreases in the frequency of negative thoughts, as shown on the ATQ; and (3) improvements in some behavioral limitations, as shown on the SF-36. Similar results were obtained by Klatt et al¹⁶ in their study assessing the effects of low-dose MBSR intervention in healthy adults. Besides reduction in perceived stress, participants reported significant increase in mindfulness and improvement in sleep after the intervention.¹⁶ Shapiro et al²⁰ also demonstrated that MBSR practices are associated with increase in mindful attention, emotion, and well-being in young adults, and the results are maintained even at 2-month follow-up.²⁰ In clinical population, people with social anxiety disorder who practiced MBSR also experienced reduction in emotional reactivity to tasks requiring increased emotional regulation, decrease in negative emotions and self-beliefs, and reduction in avoidance behaviors.³⁷

Overall, based on the literature and evidence from previous studies on mindfulness, it is understandable as to why the mindfulness group in the current study showed significant changes, not only in anxiety and depression but also in psychosocial, motivation, and awareness factors. Perhaps the cognitive focus led to the changes in its assessments in this study. Even though the yoga program included mindfulness and meditation activities, the additional changes observed in the mindfulness group suggest that the differences could be due to the cognitive component included in the mindfulness section. Or the differences could simply be attributed to the different mechanisms of action of yoga and mindfulness. For that determination, further research is needed.^{11,12}

Again, it is important to note that other factors may have influenced the results of the current study, such as the overall durations of the intervention programs. The average duration of practice for the yoga program was 7 weeks, participants in the mindfulness program practiced for 9 weeks. Although the difference in duration of practice wasn't statistically significant, 2 weeks of extra training in mindfulness could potentially have resulted in some positive changes in the group.

In addition, the educational levels of the groups differed, with the average for the mindfulness group being approximately 18 years, which was greater than that for the yoga group, which was approximately 16 years. The educational differences may have had a limited effect on the results because all participants had a minimum secondary education.

Another possible explanation to the differences in the changes between baseline and postintervention in the groups is that participants were given the freedom to choose their intervention program, and this could have contributed to some of the observed differences in performance.

A major limitation to the current study could be that it was a retrospective analysis of data that had already been obtained and not a true experimental study with a controlled research paradigm. It was difficult to control for other contributing variables such as the homogeneity of groups, education, preconceived notions, and attitudes and beliefs about the training program. Also, the current research team did not have access to any direct identifiers or information for participants, making it difficult to follow up and find out if the benefits to psychosomatic and physical well-being were sustained. Further research would be beneficial in determining if the results observed in the current study could be replicated with more experimental controls.

CONCLUSIONS

The overall findings of the current study suggest that the yoga and the mindfulness programs were both effective. While significant differences existed between the groups only for limitations due to physical health, the significant increases in categories other than anxiety and depression for the mindfulness group suggest that mindfulness can offer a more encompassing intervention for improving psychosomatic well-being. Nevertheless, further studies are suggested, with inclusion of more uniform groups of participants, more experimental controls, and same intervention duration of programs.

AUTHOR DISCLOSURE STATEMENT

Authors have no conflict of interest to report.

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