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BRIEF REPORT

A YOGA INTERVENTION FOR YOUNG ADULTS WITH ELEVATED SYMPTOMS OF DEPRESSION

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Context • *Yoga teachers and students often report that yoga has an uplifting effect on their moods, but scientific research on yoga and depression is limited.*
Objective • *To examine the effects of a short-term Iyengar yoga course on mood in mildly depressed young adults.*
Design • *Young adults pre-screened for mild levels of depression were randomly assigned to a yoga course or wait-list control group.*
Setting • *College campus recreation center.*
Participants • *Twenty-eight volunteers ages 18 to 29. At intake, all participants were experiencing mild levels of depression, but had received no current psychiatric diagnoses or treatments. None had significant yoga experience.*
Intervention • *Subjects in the yoga group attended two 1–hour Iyengar yoga classes each week for 5 consecutive weeks. The classes emphasized yoga postures thought to alleviate depression, particularly back bends, standing poses, and inversions.*
Main Outcome Measures • *Beck Depression Inventory, State-Trait Anxiety Inventory, Profile of Mood States, morning cortisol levels.*
Results • *Subjects who participated in the yoga course demonstrated significant decreases in self-reported symptoms of depression and trait anxiety. These effects emerged by the middle of the yoga course and were maintained by the end. Changes also were observed in acute mood, with subjects reporting decreased levels of negative mood and fatigue following yoga classes. Finally, there was a trend for higher morning cortisol levels in the yoga group by the end of the yoga course, compared to controls. These findings provide suggestive evidence of the utility of yoga asanas in improving mood and support the need for future studies with larger samples and more complex study designs to more fully evaluate the effects of yoga on mood disturbances. (Altern Ther Health Med. 2004;10(2):60-63.)*

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It is not unusual for yoga teachers and students to report that yoga has an uplifting effect on their moods, even when they are dysphoric. Congruent with these reports, a small body of research suggests that yogic techniques may help alleviate symptoms of depression.[1-3] Other studies on non-depressed persons have found increased positive and decreased negative mood following yoga practices.[4-7]

However, the validity and clinical utility of these findings have been questioned because of a number of methodological limitations. In addition, these studies used different forms of yoga (eg, breathing, meditation, physical postures), making it difficult to determine whether the mood-enhancing effects of yoga are general or specific to certain approaches or teachers. To our knowledge, no prospective studies have tested how the practice of physical postures (*asanas*), as opposed to breathing and meditation, impacts mood in persons who are depressed.

The purpose of this pilot study was to examine the effects of a five-week Iyengar yoga course on symptoms of depression in mildly depressed young adults. Within the Iyengar yoga tradition, based on the teachings of yoga master B.K.S. Iyengar, specific asanas and sequences of asanas are thought to be particularly effective for alleviating depression.[8] These include asanas that open and lift the chest, especially back bends, inversions, and vigorous standing poses.

Therefore, we expected that mildly depressed adults who participated in an Iyengar yoga course for depression would show a reduction in self-reported symptoms of depression by the end of the course, compared to those who were randomly assigned to a wait-list control group. Additionally, since symptoms of depression and anxiety are often associated, we expected that those who took the yoga course would evidence reductions in trait anxiety, as well as immediate reductions in acute negative mood and fatigue following each yoga class. Finally, since depression has been associated with abnormal levels of cortisol, we explored changes in morning cortisol levels. No predictions were made in this regard.

METHODS

Subjects

To test these hypotheses, 28 volunteers ages 18 to 29 (mean age = 21.5, sd = 3.23) were recruited. The majority of subjects were females (79%) and students (82%). At intake, all subjects were experiencing mild levels of depression, as indicated by a score of 10-15 on the Beck Depression Inventory (BDI),[9] but had no current psychiatric diagnosis, nor were currently receiving any treatment for any psychiatric condition. They were not already practicing yoga or other forms of complementary/alternative medicine, had no medical contraindications to exercise, were not suicidal, were non-smokers, and had no current problems with alcohol or substance abuse.

A variety of recruitment strategies were used to screen, select, and enroll the 28 eligible subjects. They were randomly assigned to the yoga group (N = 13) or to a wait-list control group (N = 15). During the course of the study, 3 subjects dropped out of the yoga group and two dropped out of the control group. The research was conducted after obtaining approval from the Human Subjects Protection Committee and was carried out consistent with the ethical guidelines of the American Psychological Association.

Measures

A short battery of self-report measures was administered at pre- and post-test, including the BDI,[9] the Spielberger Trait Anxiety Inventory[10] (STAI), and the Profile of Mood States[11] (POMS), which was administered to assess current mood before and after the first, fifth, and last classes. Brief surveys also were administered at pre-test to assess interest, motivation, and expected benefits from taking yoga.

Cortisol samples were collected via plastic salivettes. Subjects were instructed to provide saliva samples immediately upon awakening on 3 different mornings (pre-test, midcourse, and post-test). Subjects returned samples on the same days that they collected them, and the samples were immediately stored in a freezer. Cortisol was measured using a high sensitivity salivary cortisol immunoassay kit (Salimetrics, State College, PA).

TABLE 1 Means and Standard Deviations of Depression, Anxiety, and Cortisol, by Group

Group	YTime	Depression[1]	Anxiety[2]	Cortisol (ug/dL)
Yoga	Pretest	12.77 (4.53)	49.58 (5.63)	.45
	Midcourse	4.50 (3.78)	NA[3]	.35
	Posttest	3.90 (4.66)	39.60 (6.20)	.43
Wait-List	Pretest	12.07 (4.41)	45.73 (8.15)	.44
	Midcourse	10.67 (5.23)	NA	.37
	Posttest	11.00 (4.32)	45.85 (7.44)	.32

[1] Beck Depression Inventory Score.
[2] Spielberger Trait Anxiety Score.
[3] Anxiety only was measured at pretest and posttest.

Yoga Class

Subjects in the yoga group attended two 1 hour yoga classes each week for 5 consecutive weeks. Classes were held in the morning at a campus recreation center. Subjects were taught the Iyengar approach to yoga by a certified Iyengar yoga teacher. The classes emphasized postures that, according to the Iyengar yoga perspective, are supposed to alleviate depression, particularly back bends, standing poses, and inversions. Classes ended with relaxation postures that open the chest. All subjects were taught the same asanas, the one exception being that menstruating women practiced alternatives to inversions. (Most systems of yoga discourage menstruating women from practicing inversions.) Subjects were not encouraged to practice at home.

Control Group

Subjects in the control group were asked to maintain their routine activities and not begin any yoga or other mind-body program during the course of the study. Controls attended three data collection meetings at pre-test, mid-course, and post-test that were time-matched to weeks during which subjects in the yoga group provided equivalent data. All subjects (yoga and control) received $30 gift certificates for participating in the study.

RESULTS

Independent t-tests comparing the yoga and control groups at baseline indicated no group differences in depression, anxiety, interest in learning yoga, motivation to attend yoga classes, or expected benefits from learning yoga.

Paired *t*-tests conducted within each group showed that depression scores at baseline differed from depression scores after the last yoga class for subjects in the yoga group ($t(9) = 5.31$, $P < .001$) but not for control subjects ($t(12) = .78$, $P = .45$). Following these initial analyses, a 2 X 3 repeated measures ANOVA using GLM was conducted to test for group differences on depression at baseline, midway through the yoga course, and at end of the yoga course. As expected, the results indicated that the yoga group showed a significantly greater reduction in depression compared to the control group, $F(2,20) = 9.04$, $P < .01$ (see Figure 1). Post-hoc comparisons indicate that these differences emerged midway through the course ($t(21) = -3.13$, $P < .01$) and were maintained at the end of the yoga course ($t(21) = -3.78$, $P < .001$). A similar pattern emerged for trait anxiety, with the yoga group participants reporting decreased anxiety compared to controls, $F(1,21) = 28.61$, $P < .001$ (see Figure 2).

To determine if change in depression was related to change in anxiety among yoga participants, change scores were computed for depression and anxiety, and a Pearson correlation was conducted. Results indicated that change in depression was not significantly related to change in anxiety ($r = .30$, $P = .41$), and that these mood changes were unrelated to subjects' initial interest, motivation, and expectation of benefit surrounding yoga.

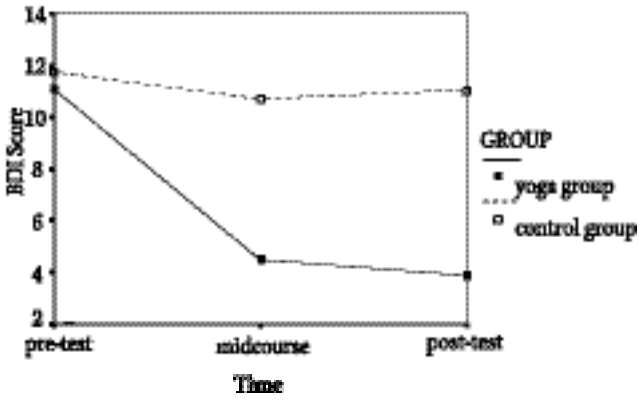

FIGURE 1 Change in depression scores by group (yoga versus control) across pre-test, midcourse, and post-test. BDI = Beck Depression Inventory

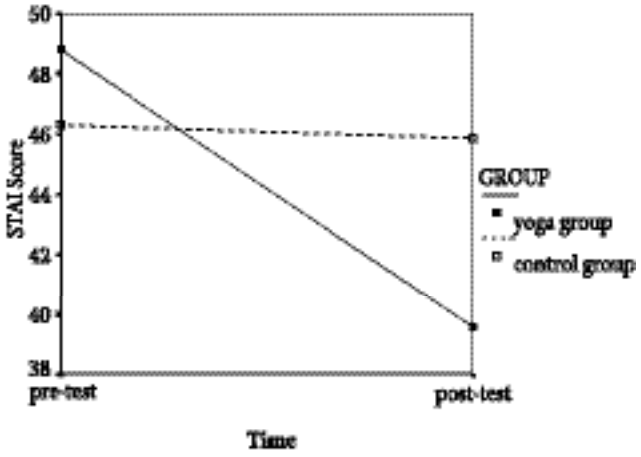

FIGURE 2 Change in anxiety scores by group (yoga versus control) from pre-test to post-test. STAI = State Trait Anxiety Inventory

Next, exploratory paired t-tests were run to assess the impact of the yoga classes on acute mood. The results indicated significant pre- to post-class reductions in depression-dejection, tension-anxiety, anger-hostility, fatigue-inertia, confusion-bewilderment, and total mood disturbance at the first and fifth classes. Significant reductions in confusion-bewilderment and total mood disturbance were observed at the last class.

Finally, independent sample t-tests were conducted to test for group differences in morning cortisol level. No differences were observed at baseline or midcourse, but a trend emerged at the end of the yoga course indicating that participants in the yoga group evidenced higher morning cortisol levels than the controls, $t(17) = 1.83$, $P = .08$.

Discussion

This randomized, case-control study examined how participating in a 5-week, 10-session Iyengar yoga course affected mood in individuals with mild levels of depression. The results confirmed expectations of the potential benefits of using yoga asanas that open and lift the chest, particularly backbends, as well as standing poses and inversions to improve mood. These effects were most evident by the middle of the yoga course and continued through the end of the course.

Various aspects of the class could account for the observed effects of yoga on mood. The yoga classes were activating in that they were vigorous and occurred relatively early in the morning. Participants were challenged to learn fairly difficult asanas and, consequently, may have experienced enhanced feelings of mastery. From the yogic perspective, the backbends and other chest-opening poses emphasized in these classes may have countered the slumped body posture associated with depression. Interestingly, a connection between open body posture and mood has been supported by several psychological studies.[12-13] Finally, the classes may have provided stress relief by combing intense focus on joint and muscle movements during the classes with relaxation at the end of each class. Future research should further explore these and other potential mechanisms.

These findings on self-reported mood are supported by suggestive evidence of slightly higher morning cortisol levels in those who participated in the yoga classes compared to controls by the end of the course. Although elevated cortisol responses to stress are associated with pathophysiological consequences, higher morning cortisol levels have been associated with self-esteem, hardiness, and tenacity, and lower levels of nervousness, depression, and emotional lability.[14-15]

These results, while encouraging, should be treated with caution because of several methodological limitations. For example, the use of a wait-list control condition, as opposed to a placebo or alternative treatment control condition, limits our ability to distinguish the effects of yoga training from the possible effects of attention and expectation. The small sample size also limits power to adequately test changes in cortisol, and the mood measures are limited by the social desirability inherent in all self-report measures. A longer intervention period might have augmented the positive effects of the yoga. The study would have been strengthened by the inclusion of a baseline washout period, so that subjects whose scores dropped below the inclusion cutoff could be dropped before treatment. Future studies should address these limitations by employing alternative control conditions, larger samples, more diverse outcomes (particularly clinician-based ratings of depression), a broader array of biological measures, and participants with more moderate levels of depression.

Future studies should also investigate whether the mood-moderating effects of yoga are comparable to those observed for aerobic exercise, which has been shown to be an effective treatment for depression.[16] Although yoga and exercise are not synonymous, both are activating. Therefore, comparison trials could explore whether yoga has effects on depression beyond the effects of general activation, as well as test for differences in the speed and magnitude of response to yoga versus exercise.

In conclusion, this randomized pilot study indicates that participating in a short-term Iyengar yoga course may have therapeutic benefits for people experiencing mild levels of

depression. These benefits include reductions in depression and anxiety, improved acute mood, and possible modulation of cortisol. Future research should seek to replicate and extend these findings while addressing the limitations of this pilot study.

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