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Yoga, Anxiety, and Some Cardiovascular Risk Factors in Women[1]

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Abstract

This study aimed to examine the effects of a yoga program on anxiety, and some cardiovascular risk factors. Forty-six elderly participants aged 40–51 years women. The yoga program was based on 3 times/week for 10 weeks a set of yoga techniques, in the form of asana (postures) and deep relaxation technique, pranayama (breathing techniques) and meditation three for 60 minutes three times a week. The level of anxiety and decreased the risk factors for cardiovascular disease risk factors (CVD). The yoga program reduced the level of anxiety and decreased the risk factors for cardiovascular disease risk factors (CVD) in the experimental group. After 8 weeks of the yoga program. SBP, DBP, BMI, HR and WC values were improved. It is likely that the yoga practices of controlling body, mind, and spirit combine to provide useful physiological effects for healthy people and for people compromised by cardiovascular disease.

Keywords: blood pressure, cardiovascular disease, hypertension, mortality, anxiety, obesity

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Introduction

The relationship between hypertension and cardiovascular disease is well established (Hajjar & Kotchen, 2003). The occurrence of hypertension in the United States is increasing despite increased wakefulness of the importance of controlling blood pressure. Antihypertensive treatment is very important to prevent major cardiovascular complications such as stroke, congestive heart failure, coronary artery disease, and cardiac hypertrophy. *The Seventh Report of the Joint National Committee on Prevention, Detection, Evaluation, and Treatment of High Blood Pressure* guidelines recommend early intervention for pre-hypertension [Chobanian et al., 2003]. Interventions to control blood pressure include lifestyle modification and antihypertensive drug therapy.

It was confirmed that cardiovascular diseases (CVD's) continue to be the leading cause of morbidity and mortality worldwide (Geish et al., 2010). The prevention, detection, and control of blood pressure (BP) should be a main concern for preventing cardiovascular disease (Roest, et al., 2010). Also, obesity, particularly abdominal adiposity, is related with an increased risk for CVD and mortality (Kearney et al., 2005]. Body mass index (BMI) and waist circumference (WG) are indices recommended by the World Health Organization for diagnosing obesity. Considering BMI and WG together provides a further comprehensive test for CVD risk factors (Menke et al., 2007). Anxiety is an independent risk factor for incident coronary heart disease (CHD) and cardiac mortality. There are also positive relationships between anxiety and CHD mortality and morbidity (WHO) 1988).

Yoga is qualitatively different from any other mode of physical activity in that it consists of a unique combination of whole-body isometric muscular contractions, stretching exercises, relaxation techniques, and breathing exercises (Mei-Ying et al., 2013). Yoga is a potentially promising physical activity for older adults. Surveys show that many older adults in the United States are practicing yoga. Many forms of yoga exist—such as Hatha, Iyengar, and other yoga forms—that aim to promote overall movement, health, and wellness (Neela et al., 2012). Few studies provide an effective and economical intervention strategy to reduce anxiety (Mei-Ying et al., 2013). Also, Immerging research indicates Yoga as important modulator of blood pressure (Barnes et al., 2004; Viskoper et al., 2003). Much less is known about changes in blood pressure and other cardiovascular responses to yoga practice in elder women (Steven et al., 2013]. Thus, this study aimed to examine the effects of a yoga program on anxiety, SBP, DBP, BMI, and WG in adults and elders.

Methodology

Forty-six participants aged from 40 to 51 years old women agreed to participate in a 8-week intervention program. The intervention group had 23 participants, and the control group had 23 participants. However, three participants from the control group did not complete the intervention. The absolute sample comprised 20 intervention group subjects and 23 control group subjects.

The intervention was carried on by a qualified yoga instructor teaching at one of the facilities of Istanbul Municipality. The yoga group practiced a set of yoga techniques daily, in the form of asana (postures) and deep relaxation technique, pranayama (breathing techniques) and meditation three for 60 minutes three times a week(Steven et al., 2013). The control group continued their usual exercise routine during the period of the study. All measurements for all

subjects from the two groups were completed at baseline, after 8 and 10 weeks in the yoga gym.

Measurements

Blood Systolic and diastolic blood pressures**;** Blood Systolic and diastolic blood pressures were recorded by using a sphygmomanometer according to the guidelines established by the American Heart Association.

Body Mass Index and Waist Circumference**;** WC was measured in centimeters by using a standard clothing ruler. Bodyweight height and BMI were measured with Tanita Inner Scan Body Composition Monitor 6 in 1 (TANITA B & 519; Japan). BMI was measured by body weight (in kilograms) divided by the square of the height (in meters).

Anxiety Index; The Beck Anxiety Inventory (BAI) is a 21-item multiple-choice self-report inventory that can be completed in 5 to 10 minutes. The BAI is a four-point scale, with zero signifying no problem and three indicating an extreme problem. Its total score ranges from 0 to 63. A total score of 0 to 7 is interpreted as a "minimal" level of anxiety; 8 to 15 as "mild"; 16 to 25 as "moderate"; and 26 to 63 as "severe. [8]

Statistical Analysis

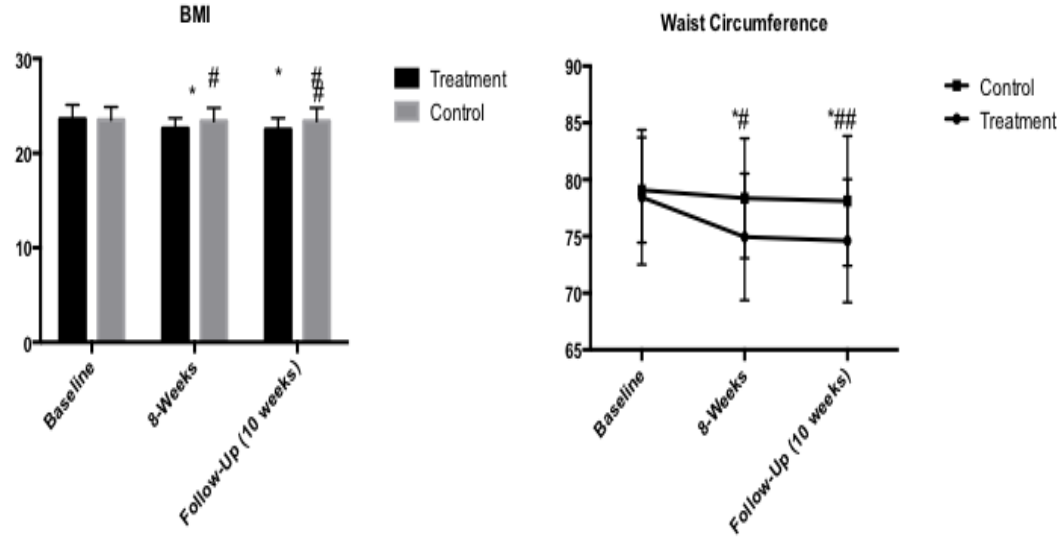
Results were analyzed using the SPSS version 22.00 (SPSS Inc., Chicago, USA). The average and standard deviation of all parameters were calculated. It was determined that the data are normally distributed. A repeated-measures analysis of variance (ANOVA) was used to establish differences between treatments over time. When significant F -values was observed, a Bonferoni stepwise adjustment was applied for post-hoc comparisons. Statistical significance was accepted at an alpha -level of 0.05. The paired t-test for to compare pre and post values and independent t-test were used to analyze group differences.

Findings

Average age of experiment group was 43.23 ± 3.67 and average age of control group was 44.64 ± 4.09. This study assessed the effect of yoga as an effective tool with no diet restriction to improve anxiety and depression symptoms as well as obesity in elders. The results showed differences in outcomes for the yoga.

For WC, the treatment group had lower WC at posttest (74.95 ± 5.59 vs. 78.36 ± 5.28, p = .043) (Figure 1) and follow-up (74.61 ± 5.43 vs. 78.21 ± 5. 72, p = .038) (Figure 1). For BMI, there was no significant difference at pretest for the two groups. However, the experimental group had lower BMI at posttest (22.64 ± 1.58 vs. 23.58 ± 1.49, p = .041) and follow-up (22.53 ± 1.22 vs. 23.47 ± 1. 42, p = .024) (Figure 1).

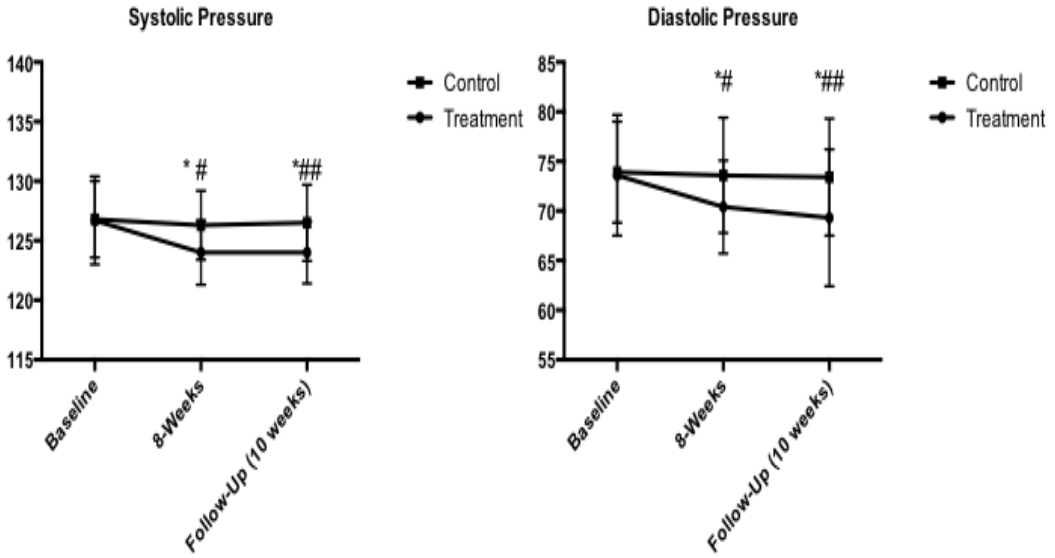
Figure 1. BMI and waist circumference valuesbetween the groups and time frames after the yoga exercise program



Comparasion of two groups at baseline, 8 weeks, and follow-up. * = siginificant diffrences between the groups. # = significant difrences with baseline values. ## = significant differences with 8 weeks' values.

The treatment group had lower SBP at posttest (124.0.95 ± 2.79 vs. 126.30 ± 2.94, p = .014) and follow-up (124.04 ± 2.61 vs. 126.52 ± 3.21, p = .008) than did the control group (Figure 2). Also, treatment group had lower DBP at posttest (70.42 ± 4.47 vs. 73.69 ± 5.89, p= .049), and follow-up (69.33 ± 6.98 vs. 73.34 ± 5.90, = .040) than did the control group (Figure 2).

Figure 2. Systolic and diastolic pressure values between the groups and time frames after the yoga exercise program

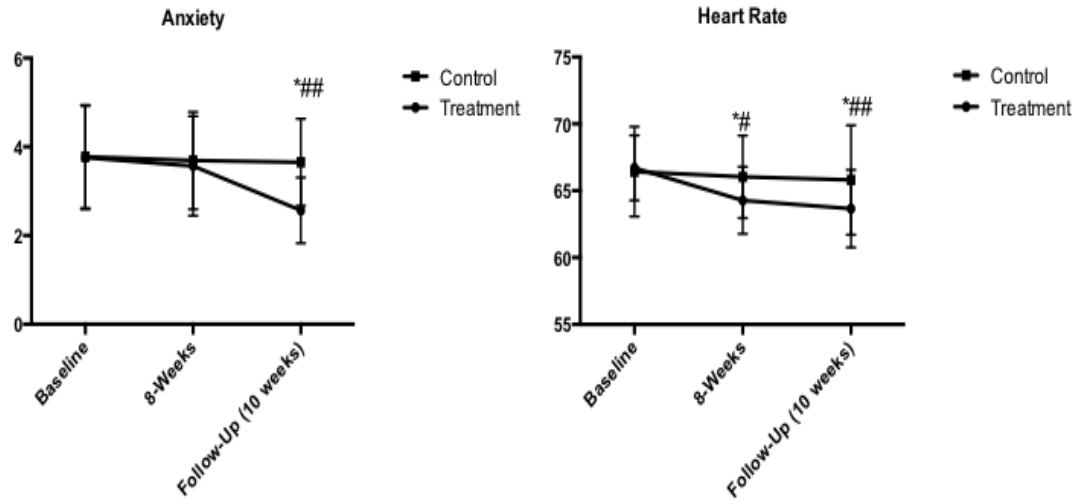


Comparasion of two groups at baseline, 8 weeks, and follow-up. * = siginificant diffrences between the groups. # = significant difrences with baseline values. ## = significant differences with 8 weeks' values.

For HR, there was no significant difference at pretest for the two groups. However, the

experimental group had lower HR at posttest (64.28 ± 2.51 vs. 66.04 ± 3.81, p = .045) and follow-up (63.66 ± 2.90 vs. 65.86 ± 4.09, p = .047) (Figure 3). For anxiety level, the two groups had no difference at pretest and posttest. The experimental group had lower anxiety level than the control group at follow-up (2.57 ± 0.74 vs. 3.65 ± 0.98, p= .001) (Figure 3).

Figure 3. Heart rate and anxiety values between the groups and time frames after the yoga exercise program



Comparasion of two groups at baseline, 8 weeks, and follow-up. * = siginificant diffrences between the groups. # = significant difrences with baseline values. ## = significant differences with 8 weeks' values.

Discussion and Conclusion

In this experimental study, yoga program reduced the level of anxiety and decreased the risk factors for cardiovascular disease risk factors (CVD) in the experimental group. After 8 weeks of the yoga program. SBP, DBP, BMI, HR and WC values were improved.

In the present study, blood pressure and heart rate values were improved causing a decrease in CVD risks. Similar findings were fund in previous studies. For example, Seventeen hypertensive individuals of 40-80 years old were included in research carried out by Viskoper and his colleague (2003). Participants performed device guided slow breathing exercise for 15 minutes a day for eight weeks. Blood pressure was measured at home daily and at medical office on 4^{th} and 8^{th} week. The study showed 74% compliance to blood pressure measurement at home. Researchers concluded slow breathing decrease mean blood pressure, systolic and diastolic blood pressure. Results suggest that slow breathing has some modulating effect on the cardiovascular system by increasing baroreflex sensitivity, heart rate variability, venous return and reducing peripheral resistance (Daly et al., 2003). Although any modifications in pharmacological treatment were not done by researchers, possibilities of using another diet or physical exercise by experimental group at home could not be denied. Other limitations include sample size and lack of randomization.

Barnes et al. study (2004) showed decrease in blood pressure in African American adolescents after transcendental meditation. Subjects were 14 to 16 years old with risk of developing hypertension. Hundreds subjects were randomly assigned to 4 months transcendental meditation or health education control group. Experimental group performed

meditation for 15 minutes twice daily. Control group was educated on lowering blood pressure through weight management, diet, and physical activity. There was 3.5 mmHg and 3.4 mmHg decrease in systolic and diastolic blood pressure respectively after transcendental meditation compared to control group. Researchers anticipated decrease action of sympathetic nervous system for seen decrease in blood pressure. Moreover, decrease in neuro-hormonal activity after transcendental meditation may decrease stress on circulatory system and on heart. Consequently, improvement in myocardial and vascular function could lead to decrease blood pressure levels. Cohen et al. (2011) conducted randomized controlled trial to evaluate cardiovascular and physiological effect of 12 week structured Iyengar yoga program compared with enhanced usual care. There was strict control to include subjects of only untreated pre-hypertensive stage. Iyengar yoga program was divided in two half. 23 subjects of experimental group attended Yoga classes 70 minutes twice a week for six week followed by once a week for six weeks. Thirty-one participants of enhanced usual care attended four one hour group classes in 12 weeks. Result showed decrease in systolic blood pressure by 6 mmHg and diastolic blood pressure by 5 mmHg. This decrease in blood pressure was not significant as control group also showed decrease in blood pressure after 12 weeks of diet control. Researcher expected significant decrease in systolic blood pressure after yoga practice as it decreases oxidative stress (Yadav et al., , 2005). However, Iyengar yoga is not traditional aerobic form of yoga and could be discouraging to yoga learners; Researcher suggested future study with more traditional yoga exercise in similar population. Perhaps including another experimental group who perform yoga with diet control along with other experimental group would give defined representation. Conflicting results of these studies could not confirm the role of the Yoga on cortisol and catecholamine metabolism (Cohen et al, 2011). Urinary and salivary cortisol, and plasma level of aldosterone, and rennin were measured as biochemical markers of the blood pressure. Mechanism of reducing blood pressure after yoga practice would be clearer if stress markers such as cortisol and catecholamine level in blood and saliva would be measured. In contrast to other study, (Sivasankaran et al., 2006) no difference was observed in catecholamine and cortisol metabolism in between the groups. Many studies have suggested improvement in baroreflex sensitivity after yoga practice in hypertensive and chronic heart failure patients (Barnes et al., 2007; Ray et al., 2011).

In the present study, anxiety levels were dropped only after the follow-up for the treatment group. It was stated that many studies about the effects of yoga on physiological markers of stress and anxiety yielded inconsistent support of yoga for relief of stress and anxiety (Telles et al., 2009; Li AW et al., 2012, Chung et al. 2012). However, evaluation of the current primary literature is suggestive of benefits of yoga in relieving stress and anxiety. For example, within-group pre- versus post-treatment comparisons showed significant improvement in quality of life, anxiety, and blood pressure in the meditation group ($p<0.001$), while in controls, quality of life deteriorated and there was no improvement in blood pressure that which is the cardiovascular marker of anxiety. The study concluded that the improvement in quality of life, anxiety reduction, and blood pressure control was greater in the meditation group (Telles et al., 2009). In another study in older adults with COPD, there were no significant changes in depressive symptoms, anxiety, or general disease-specific HRQ (Donesky-Cuenco et al., 2009). Nevertheless further investigation into this association with using large, well-defined populations; satisfactory controls, randomization and long duration should be explored before recommending yoga as a treatment option.

In the present study, BMI and WC were reduced after yoga treatment. Similar findings were reported previously. A study that assessed obese subjects who participated in yoga group showed more improvement in pulmonary functions and reduce BMI compared to subjects who participated in aerobic group. This could be due to the effect of yoga postures that involves physical and mental components [Shinde et al., 2013].

In summary, it is likely that the yoga practices of controlling body, mind, and spirit combine to provide useful physiological effects for healthy people and for people compromised by cardiovascular disease. Even though, some contradictory results suggest, the large samples-long-term future studies with strict control in methodology. Yoga along with other form of exercise should be considered to enhance the physical fitness. However, further research is required to understand the mechanisms underlying the changes and the long-term consequences of the practice.

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