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Impact of Yoga on Specific Risk Factors in Middle-Aged Women with Hypertension

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Abstract: This randomised controlled trial set intended to examine the results of yoga practises on Systolic BP and Total Cholesterol in hypertensive middle-aged women. Thirty middle-aged hypertensive women from the city of Chennai were recruited at random using a random group sample approach and were divided into two groups of 15 patients each (Experimental group and Control group). The hypothesis was that middle-aged hypertensive women's Systolic Blood Pressure and Total Cholesterol would differ significantly from those of the Control group as a result of their yoga practises. Prior to the start of training, a preliminary test was performed on a chosen dependent variable. The yoga practises of the experimental group lasted for 12 weeks, with each session lasting no more than an hour each morning. The control group was required to maintain a state of mild activity. After the training period ended, both groups were given a post-test measuring the same dependent variables, including systolic blood pressure and total cholesterol. Analysis of Co-Variance (ANCOVA) was used to statistically compare the data from each group. A 5% level of significance was chosen for the test. The study found that the Experimental group's yoga practises led to statistically significant improvements in comparison to the Control group in terms of some variables including Systolic Blood Pressure and Total Cholesterol. Therefore, the hypothesis was accepted with a 0.05 level of confidence. Therefore, it can be inferred that yoga activities help middle-aged hypertensive women keep their Systolic Blood Pressure in check and their Total Cholesterol levels low.

Keywords: Yogic techniques, Systolic blood pressure, Total cholesterol, Hypertension


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Introduction

Hypertension cases are increasing at an alarming rate today. It is still the leading cause of death worldwide and the leading cause of cardiovascular disease. One in every thirteen people has high blood pressure (World Health Organization, 2019). Hypertension is common among middle-aged women for a variety of reasons, including but not limited to: family obesity, stress, migraine attacks in the second half of the menstrual cycle, ongoing work stresses, diet, and lifestyle, etc.
Hypertension is commonly seen in middle-aged women experiencing the menopausal transition because of the hormonal changes that occur during this time (Pramanik et al., 2009).

Yoga is a complementary and alternative medicine practice that has been shown to reduce hypertension. By controlling the parasympathetic nervous system, yoga practices benefit both physical and mental well-being. Secondary cardiac problems from persistent hypertension respond well to yoga's stress-reducing and breathing-focused practices.

The study aimed to compare systolic blood pressure and total cholesterol levels among middle-aged hypertensive women to determine if there were any statistically significant differences. The goal of this research was to determine whether or not middle-aged hypertensive women could benefit from yoga activities in terms of lowering their Systolic Blood Pressure and Total Cholesterol. It was expected that middle-aged hypertensive women would show significant changes from the Control group as a result of yoga practices on chosen Physiological variables, such as Systolic Blood Pressure, and Biochemical variables, such as Total Cholesterol. The participants were restricted to middle-aged hypertensive women living in Chennai City.

It was assumed that the participant was between the ages of 40 and 50. Only yoga practices were used as an independent variable in the study. Systolic BP and Total Cholesterol were the only outcomes measured. Considerations such as socioeconomic standing were disregarded. Climate was not taken into account. Lifestyle choices and other non-biological variables were ignored. The individuals' typical daily routines were not considered. Both the subjects' diets and their medication schedules were unregulated.

**Materials and Methods**

90 middle-aged hypertensive women volunteered for the study in Chennai; 60 were screened, and 30 were chosen at random. All of the participants were above 40, with the median age being 50. Fifteen participants were split evenly between an experimental group and a control group. Prior to beginning training, participants were given a pre-test to evaluate their baseline performance. For 12 weeks, those in the yoga group practiced (Loosening the Joints, Tadasana, Katichakrasana, Hastottanasana, Vajrasana, Ustrasana, Gomukhasana, Shashangasana, Vakrasana, Bhujangasana, Makarasana, Savasana, Pranayama, including Nadishodana Pranyama and Brahmari Pranayama, and finally OM), while those in the control group rested actively.

Systolic blood pressure, total cholesterol, and other predetermined dependent variables were assessed again after 12 weeks, and statistically significant differences between the groups were determined using Analysis of Co-Variation (ANCOVA). The significance threshold used in the test was predetermined to be 0.05.

**Results**

Analysis of Co-variance (ANCOVA) was used to statistically analyse the data pertaining to the variables obtained from the two groups before and after the training session and a significance test was performed at the 0.05 level of confidence. Tables 1 and 2 display these results.

At the 5% significance level, the obtained F ratio on the pre-test scores 0.56. Evidence that the pre-test randomization was fair and that there was no significant difference in systolic blood pressure between the groups was provided. In agreement with the research by Pandyal et al. (2020) the analysis of post-test and adjusted post-test scores showed that there was a statistically significant difference between the groups. The obtained F values (4.38 and 13.36) were larger than the needed F values (4.2 and 4.21). Figure 1 depicts the average systolic blood pressure readings for the Experimental group and the Control group before and after treatment.

At the 0.05 level of significance, the F ratio of 1.60 on the pre-test scores did not meet the
Table 1: Analysis of co-variance of the means of experimental group and control group on systolic blood pressure (mmHg)

<table>
<thead>
<tr>
<th>Test</th>
<th>Experimental Group</th>
<th>Control Group</th>
<th>Source of Variance</th>
<th>Sum of Squares</th>
<th>df</th>
<th>Mean Squares</th>
<th>F Ratio</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pre-test</td>
<td>136.73</td>
<td>139.47</td>
<td>between</td>
<td>56.03</td>
<td>1</td>
<td>56.03</td>
<td>0.56</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>within</td>
<td>2778.67</td>
<td>28</td>
<td>99.24</td>
<td></td>
</tr>
<tr>
<td>Post-test</td>
<td>130.53</td>
<td>138.67</td>
<td>between</td>
<td>496.13</td>
<td>1</td>
<td>496.13</td>
<td>4.38*</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>within</td>
<td>3171.07</td>
<td>28</td>
<td>113.25</td>
<td></td>
</tr>
<tr>
<td>Adjusted</td>
<td>131.89</td>
<td>137.31</td>
<td>between</td>
<td>216.11</td>
<td>1</td>
<td>216.11</td>
<td>13.36*</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>within</td>
<td>436.62</td>
<td>27</td>
<td>16.17</td>
<td></td>
</tr>
<tr>
<td>Mean gain</td>
<td>6.20</td>
<td>0.80</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

*Significant at 0.05 level of confidence. (Table F ratio at 0.05 level of confidence for 1 and 28 (df) = 4.2; 1 and 27(df) = 4.21)

Table 2: Analysis of co-variance (ANCOVA) of the means of experimental group and control group on total cholesterol (mg/dl)

<table>
<thead>
<tr>
<th>Test</th>
<th>Experimental Group</th>
<th>Control Group</th>
<th>Source of Variance</th>
<th>df</th>
<th>Sum of Squares</th>
<th>Mean Sum of Squares</th>
<th>F Ratio</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pre-test</td>
<td>225.53</td>
<td>227.2</td>
<td>Between</td>
<td>1</td>
<td>227.20</td>
<td>227.20</td>
<td>1.60</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Within</td>
<td>28</td>
<td>3970.13</td>
<td>141.79</td>
<td></td>
</tr>
<tr>
<td>Post-test</td>
<td>217.47</td>
<td>231.04</td>
<td>Between</td>
<td>1</td>
<td>1009.20</td>
<td>1009.20</td>
<td>4.98*</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Within</td>
<td>28</td>
<td>5668.67</td>
<td>202.45</td>
<td></td>
</tr>
<tr>
<td>Adjusted Post</td>
<td>216.79</td>
<td>231.75</td>
<td>Between</td>
<td>1</td>
<td>1255.33</td>
<td>1255.33</td>
<td>21.96*</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Within</td>
<td>27</td>
<td>1543.18</td>
<td>57.15</td>
<td></td>
</tr>
<tr>
<td>Mean Gain</td>
<td>-8.06</td>
<td>3.84</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

*Significant at 0.05 level of confidence. (Table F ratio at 0.05 level of confidence for 1 and 28 (df) = 4.2; 1 and 27(df) = 4.21)

This demonstrated that there was no pre-test difference in Total Cholesterol between the groups, indicating that randomization was fair. Results from both the post-test and the adjusted post-test showed a statistically significant difference in Total Cholesterol between the two groups (F values of 4.98 and 21.96, respectively) were higher than the required F values of 4.2 and 4.21, in accordance with the study by Shantakumari et al. (2013).

Figure 2 is a graphical representation of the pre-test, post-test, and post-test adjusted mean values of Total Cholesterol for the Experimental group and Control group. Total cholesterol was
reduced more in the Experimental group than in the Control group. This means the theory can be accepted with 95% certainty.

**Discussion**

According to study by Pandyal *et al.* (2020), the prevalence of cardiovascular disease has increased due to modernizations in living conditions, greater facility use, increased consumption of junk food, and elevated stress levels. Aerobic activity, sports, and similar activities all have a tendency to elicit sympathetic activation. Contrarily, yoga has been shown to raise vagal tone and decrease sympathetic reactions with regular practise. Therefore, the purpose of this research was to examine the effects of yoga on heart rate, blood pressure, and diastolic blood pressure. Thirty people (both sexes) were selected at random to participate in the study. Prior to and following yoga, their heart rates and blood pressures were monitored. Statistical analysis of the data showed a highly significant drop in heart rate, systolic blood pressure, and diastolic blood pressure ($P<0.001$) yoga's effects on blood pressure in subjects. Improved heart health through regular yoga practise may help lower the risk of cardiovascular disease.
Bhavanani et al. (2011) found that the post-intervention statistical analysis revealed a substantial decrease in heart rate and a very significant decrease in systolic pressure, pulse pressure, mean arterial pressure, rate-pressure product, and double product, with a non-significant decrease in diastolic pressure.

Bhavanani et al. (2012) concluded to have potential therapeutic uses in both day-to-day life and in clinical settings where there is a pressing need to reduce blood pressure as quickly as possible. A decrease in the amount of oxygen that is consumed and the amount of work that is done by the heart is shown by the large drop in rate-pressure product and double product. It has been determined that pranava pranayama, a method that is both straightforward and economical, may be utilised, in addition to the conventional medical care, in the treatment of hypertension individuals.

The effects of yoga on dyslipidaemia in people with type 2 diabetes mellitus were studied by Shantakumari et al. (2013). The Medical College of Trivandrum in Kerala, India, was the site of this randomised parallel trial. One hundred patients with type 2 diabetes and dyslipidaemia were randomly assigned to one of two groups: control or yoga. Oral hypoglycemic medications were given to the control group. For three months, those in the yoga group also took oral hypoglycemic medications while practising yoga for an hour each day. Both groups’ lipid profiles were evaluated at the beginning and end of the study period (3 months). A reduction in total cholesterol, triglycerides, and LDL and an increase in HDL were observed in the yoga intervention group after 3 months. With its emphasis on a healthy lifestyle (including regular exercise and learning to cope with stress), yoga can help diabetic people lower their blood fat levels.
Our study shown that yogic practises among Hypertensive middle-aged women were predicted to result in substantial differences on chosen variables, such as Systolic Blood Pressure and Total Cholesterol, compared to the Control group. In a study of hypertensive middle-aged women, yoga practices were found to have a substantial effect compared to the Control group in terms of lowering both Systolic Blood Pressure and Total Cholesterol. This means the theory can be accepted with 95% certainty.

**Conclusion**

The results of this study showed that hypertensive middle-aged women's systolic blood pressure dropped and their total cholesterol dropped dramatically after engaging in yoga activities. Therefore, middle-aged women with hypertension can benefit from yoga activities.

**References**


