



"Comparative Hemodynamic Effects of Yoga and Zumba in Middle-Aged Women"

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Abstract

This meticulously designed study evaluated the impact of Zumba dance training and yoga practices on mean arterial blood pressure (MAP) and resting heart rate (RHR) in middle-aged women. A random group design was employed, involving 45 sedentary middle-aged women with a mean age of 35 ± 1 years, a mean weight of 78.1 ± 1.4 kg, and a mean height of 161 ± 1 cm. The participants were selected from Kerala, India. Before the intervention, the selected subjects were assessed for their MAP and RHR. The participants were then divided into three groups of 15 each: one group underwent eight weeks of yoga practice, another group engaged in eight weeks of Zumba dance training, and the third group served as a control group, receiving no training. Following the eight-week intervention period, post-intervention assessments were conducted to measure the MAP and RHR of the subjects. The collected data were statistically analyzed using covariance (ANCOVA) analysis, with the significance level set at 0.05. The findings, based on rigorous analysis, indicated that both yoga practices and Zumba dance training significantly reduced the mean arterial pressure compared to the control group. Moreover, Zumba training had a more pronounced beneficial effect on resting heart rate than both the yoga practice group and the control group, with these differences being significant at the 0.05 level. These findings are significant as they provide evidence for the potential of Zumba and yoga in improving cardiovascular health in middle-aged women.

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Keywords: Mean arterial blood pressure, Resting heart rate, Yoga practice, Zumba dance training.

Introduction

Physical activity is a critical component of cardiovascular health, particularly for middle-aged women who are at an increased risk of developing cardiovascular diseases. Regular exercise is known to positively influence hemodynamic parameters such as mean arterial blood pressure (MAP) and resting heart rate (RHR), which are

crucial indicators of cardiovascular function. Yoga and Zumba have gained substantial popularity among the diverse forms of physical activity. Yoga, an ancient practice combining physical postures, breathing exercises, and meditation, is lauded for its holistic benefits on physical and mental health. Zumba, a dancebased fitness program, is celebrated for its high-energy, cardiovascular workout that integrates music and dance movements. This study aims to compare the hemodynamic effects of yoga and Zumba on middle-aged women, focusing on MAP and RHR. By examining these parameters, the research seeks to elucidate the differential impacts of these two distinct exercise modalities on cardiovascular health. Understanding these effects can provide valuable insights into the most effective practices for improving cardiovascular function and overall well-being in middle-aged women, informing fitness recommendations and interventions tailored to this demographic.

Methodology: Forty-five middle-aged sedentary women aged 35 ± 1 years were selected from Kerala, India. The chosen subjects' mean weight is 78.1 ± 1.4 kgs, and the mean height is 161 ± 1 cms. The subjects were tested on the mean arterial blood pressure and resting heart rate before the training. Selected middle-aged women were equally divided into three groups of 15 each. Eight weeks of yoga practice and Zumba dance training were given to the subjects of two experimental groups; one group acted as a control group without undergoing physical training. Post-intervention assessment was conducted after the eight weeks of the intervention on mean arterial blood pressure and resting heart rate.

The collected data was statistically analyzed using covariance (ANCOVA) analysis. The level of significance was fixed at 0.05. A post-hoc analysis was performed to find the significant difference among the adjusted post-test mean. Zumba exercise was given to the selected women subjects for eight weeks. Zumba exercise training was designed four days a week for 60 minutes. The Zumba exercise started with a 10-minute warm-up, followed by 40 minutes of Zumba core step choreography exercise and ended with 10 minutes of warm-down. Yoga practice in the form of asanas was given for 60 minutes daily, four days a week.

Asana was practiced by doing 7-10 minutes of warm stretches and 40 minutes of asana practice, followed by 7-10 minutes of limbering down. Balasana, paschimothasana, janusirasana, virasana, padmasana, viparitakarani asana, uttanasana, ardhmatsyendrasana, bhujangasana, savasana were practiced.

Results and discussion

Table I: Analysis of covariance of mean arterial blood pressure of yoga practice group, Zumba dance training group and control group

Group	Mean	Test	Sources of variance	Sum of squares	Mean square	df	F-ratio
Zumba	90.6	Pretest	between	7.243	3.622	2	.069
Yoga	91.6		within	2203	52.454	42	
Control	91.2						
Zumba	86.8	Posttest	between	224.1	112.1	2	2.057
Yoga	86.9		within	2287.7	54.5	42	
Control	91.5						
Zumba	87.1	Adjusted posttest	between	222.2	111.1	2	3.249*
Yoga	86.6		within	1402.2	34.2	41	
Control	91.5						

*Significant at 0.05 level (2,42df 3.22 & 2,41df 3.23)

As mentioned in Table I, the obtained F-ratio values of 0.069 and 2.057 on the pretest and posttest were insignificant. The F-ratio value of 3.249 on adjusted posttest mean arterial blood pressure values showed a significant difference at 0.05 confidence level. Hence, the null hypothesis was rejected.

Table II: Post-hoc analysis of mean arterial blood pressure of yoga practice group, Zumba dance training group and control group

(I) Group	(J) Group	Mean Difference (I-J)	Sig.
Zumba dance	Yoga practice	.498	.820
	Control	-4.445*	.047
Yoga practice	Control	-4.943*	.028

Table II revealed significant differences between the Zumba dance training group and the control group. The yoga practice and control groups significantly differed in mean arterial pressure at the .05 confidence level. There was no significant difference between the Zumba dance training and yoga practice groups. The bar diagram gives pre & post-test mean values for better understanding.

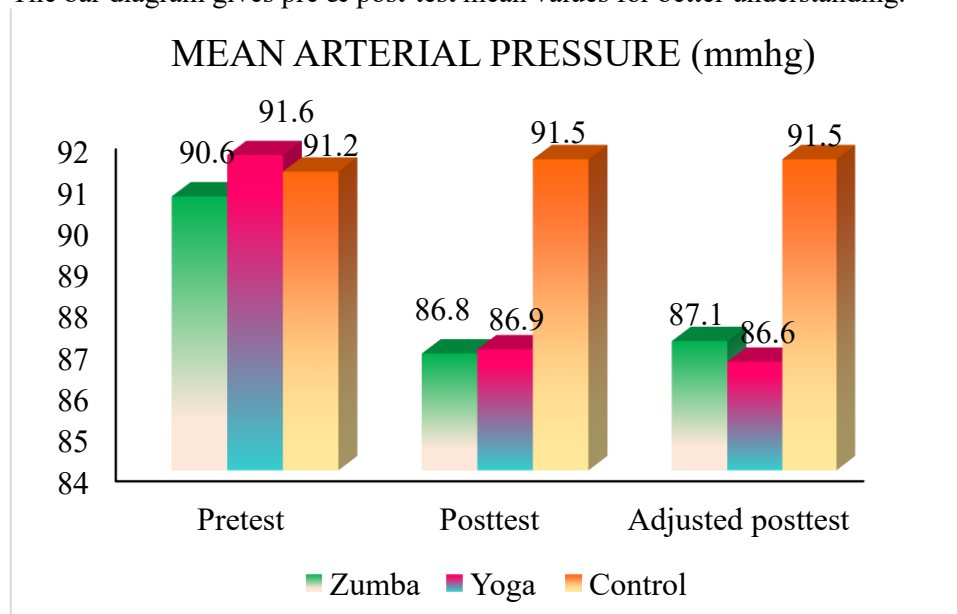


Fig 1. Pretest posttest mean values of mean arterial pressure of yoga, Zumba and control group

Table III: Analysis of covariance of resting heart rate of yoga practice group, Zumba dance training group and control group

Group	Mean	Test	Sources of variance	Sum of squares	Mean square	df	F-ratio
Zumba	93.2	Pretest	between	0.44	0.022	2	.001
Yoga	93.1		within	4540.5	108.1	42	
Control	93.2						
Zumba	86.5	Posttest	between	485.7	242.8	2	3.239*
Yoga	92.8		within	3149	74.9	42	
Control	93.9						
Zumba	86.5	Adjusted posttest	between	488.2	244.1	2	12.609*
Yoga	92.8		within	793.7	19.4	41	
Control	93.9						

*Significant at 0.05 level (2,42df 3.22& 2,41df 3.23)

As denoted in Table III, the obtained F-ratio value of .001 on the pretest showed no significant difference. The obtained F-ratio values of 3.239 and 12.609 on the posttest and adjusted posttest mean resting heart rate values showed substantial differences at the 0.05 confidence level. Hence, the null hypothesis was rejected.

Table IV: Post-hoc analysis of the resting heart rate of the yoga practice group, Zumba dance training group and control group

(I) Group	(J) Group	Mean Difference (I-J)	Sig.
Zumba dance	Yoga practice	-6.381*	.000
	Control	-7.467*	.000
Yoga practice	Control	-1.085	.503

Table IV showed significant differences between the Zumba dance training and the control groups. The yoga practice and control groups had no significant difference at the .05 level of confidence in resting heart rate. There was a substantial difference between the Zumba dance training group, the yoga practice group, and the control group.

The bar diagram gives pre- and post-test mean values for better understanding

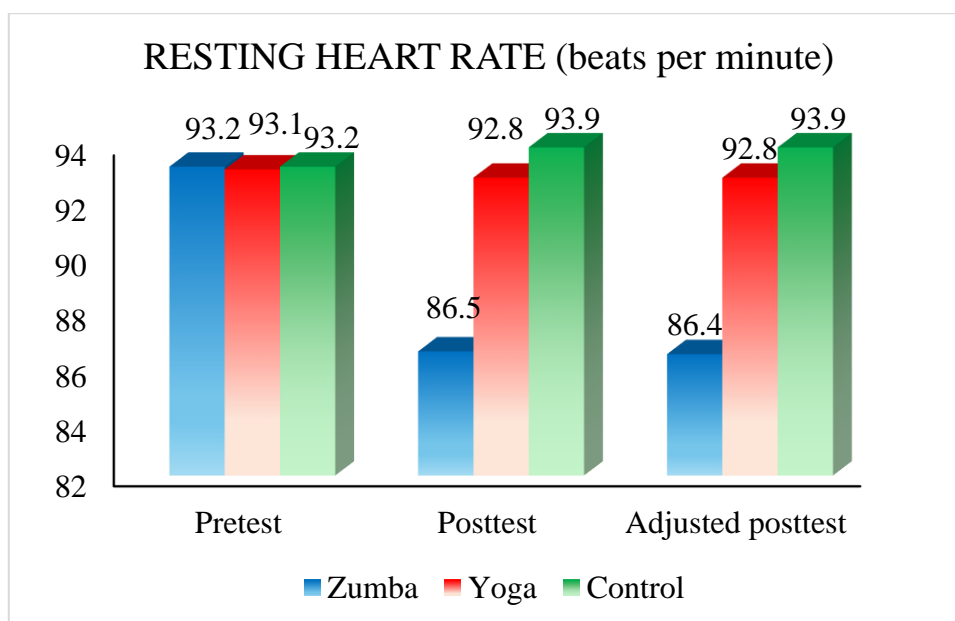


Fig 2. Pretest posttest mean values of resting heart rate of yoga, Zumba and control group

Discussion

The adjusted posttest mean values of mean arterial pressure of the Zumba dance group, yoga practice group and control group are 87.1mmHg, 86.6mmHg and 91.5mmHg. Posttest mean values of the three groups didn't show any significant difference. An important difference was observed in the adjusted posttest mean. It showed that the training intervention Zumba dance and yoga practice positively affected the mean arterial blood pressure of middle-aged sedentary women of Kerala. In contrast, the control group didn't show any improvement. 70mmhg to 90mmhg of mean arterial pressure is normal for the adult. This could be enough pressure to perfuse vital organs, including the brain, to function efficiently. The systemic Zumba dance and yoga practices improve the function of the autonomic nervous system. It regulates mean arterial pressure through baroreceptors located in the aortic arch.

The adjusted posttest mean values of the resting heart rate of the Zumba dance group, yoga practice group and control group are 86.4bpm, 92.8bpm and 93.9bpm. Posttest and adjusted posttest mean values on resting heart rate showed a significant difference between the Zumba dance, yoga practice group and control group. The mean value of the Zumba dance group showed better improvement in resting heart rate than the yoga practice group and a control group of middle-aged women in Kerala. Zumba dance improved the aerobic capacity of the subjects, and it reduced the resting heart rate (Peter LM Kerkhof and Virginia M Miller, 2018). Zumba dance enhances the heart's efficiency in pumping oxygenated blood to various tissues and organs every stroke. The increased oxygen-carrying capacity of the blood due to regular Zumba dance caused a better effect on the resting heart rate than the yoga practice.

Conclusion: It was concluded that yoga practices and Zumba dance training improved mean arterial pressure. Compared to the yoga practice group and the control group, the Zumba dance training group kept the resting heart rate at an average level. Zumba dance choreography includes effective body movements, turns, jumps, and swings. Zumba is more beneficial for developing and keeping mean arterial pressure and resting the heart rate at the normal range.

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