

EFFECT OF EIGHT-WEEK VARIED INTENSITY ZUMBA DANCE ON BLOOD LIPID PROFILE IN SEDENTARY WOMEN OF KERALA

1. Dr. Babitha Mathews,
*Assistant Professor, T.M. Jacob Memorial Govt. College, Manimalakunnu, Koothattukulam,
Kerala
babithamathews@gmail.com*

Abstract

Our study, conducted on thirty sedentary women from Kerala, India, with an average age of 30 ± 1 years, an average weight of 78.1 ± 1.4 kg, and an average height of 161 ± 1 cm, has yielded significant results. The women were divided into three groups based on their initial lipid profile levels: a control group (no exercise), a low-intensity Zumba group, and a moderate-intensity Zumba group. The Zumba exercise groups trained for eight weeks. After the training period, lipid profiles were reassessed. The striking results indicated that the moderate-intensity Zumba exercise significantly improved the blood lipid profiles compared to the low-intensity Zumba and control groups at a 0.05 significance level. This finding is crucial as it suggests that moderate-intensity Zumba exercises are more effective than low-intensity Zumba in improving blood lipid profiles in sedentary women from Kerala.

Keywords: *Blood lipid profile and Zumba exercise*

Introduction

Regular physical activity is essential for maintaining both physical and mental health. It enhances overall well-being, helps maintain a healthy weight, reduces the risk of chronic diseases, and promotes cognitive, social, and spiritual health. In South Indian culture, women are often seen as the central figures in family life, responsible for the well-being of aged parents, husbands, and children. Sheela Nambiar (2014) described women as crucial in binding and building the family. They are often busy with official and household tasks from morning until late evening, making it vital for them to maintain their health. The health of women significantly impacts the physical and mental health of other family members. Indian families honour women as central figures, akin to goddesses, but many homemakers neglect their health while caring for others. These women must engage in enjoyable physical activity, such as dancing. Healthy women contribute to healthy families, fostering healthy societies and nations. Laura A. Charlton (2008) noted that Zumba is an excellent and enjoyable physical activity suitable for sedentary women, offering both fun and fitness benefits.

Lipid profile

A lipid profile measures the levels of cholesterol and other fats in the blood, offering a comprehensive assessment of cardiovascular health. It includes total cholesterol, HDL-cholesterol (high-density lipoprotein or "good cholesterol"), LDL-cholesterol (low-density lipoprotein or "bad cholesterol"), and triglycerides. Elevated lipid levels, known as hyperlipidemia, increase the risk of heart attacks, strokes, and other cardiovascular issues due to vessel narrowing or obstruction. LDL is considered "bad" cholesterol because high levels can lead to cholesterol buildup in the arteries, raising the risk of cardiovascular diseases (Carlson, 2011). In contrast, HDL is "good" cholesterol as it helps remove cholesterol from the bloodstream, protecting against heart disease. Monitoring and managing lipid levels are essential for maintaining cardiovascular health and preventing hyperlipidemia-related complications.

Methodology

Thirty sedentary women aged 30 ± 1 years were selected from Kerala, with a mean weight of 78.1 ± 1.4 kg and a mean height of 161 ± 1 cm. Their lipid profiles were tested before the experimental training. Based on the initial lipid profile levels, the women were divided into groups 10: a control group with no

exercise, a low-intensity Zumba group, and a moderate-intensity Zumba group. The Zumba exercise program lasted eight weeks, with sessions four days a week for 60 minutes each. Each session included a 10-minute warm-up, 40 minutes of Zumba core step choreography, and a 10-minute cooldown. The low-intensity group maintained a heart rate of 109 to 119 beats per minute, with music selected to match this tempo. The moderate-intensity group had a heart rate of 144 to 154 beats per minute, facilitated by higher-tempo music. After eight weeks, lipid profiles were retested for all groups. Analysis of covariance (ANCOVA) was used to evaluate the results, with a confidence level set at 0.05.

Results and discussion

Table I
Analysis of covariance of high-density lipoprotein (HDL) of the control group (CG), low-intensity Zumba group (LIZ) and high-intensity Zumba group (HIZ)

Group	Mean	Test	Sources of variance	Sum of squares	Mean square	df	F-ratio
CG	51.7	Pretest	between	1.267	0.633	2	0.035
LIZ	51.4		within	490.1	18.15	27	
MIZ	51.2						
CG	51.7	Posttest	between	292.2	146.1	2	10.089*
LIZ	51.1		within	391	14.48	27	
MIZ	58						
CG	51.5	Adjusted posttest	between	315.4	157.7	2	47.738*
LIZ	51.1		within	85.9	3.3	26	
MIZ	58.2						

*significant at 0.05 level (2,27df 3.37 & 2,26df 3.35)

As shown in Table I, the pretest F-ratio was below the threshold for significance at the 0.05 level. However, the posttest and adjusted posttest F-ratios exceeded the required table value at the 0.05 significance level. Therefore, the null hypothesis was rejected, indicating a significant difference between the groups in high-density lipoprotein (HDL) levels.

Table II
Post-hoc analysis of adjusted posttest means of high-density lipoprotein (HDL) of the control group (CG), low-intensity Zumba group (LIZ) and high-intensity Zumba group (HIZ)

(I) Group HDL	(J) Group	Mean Difference (I-J)	Std. Error	Sig.
Control Group	Low-Intensity Zumba	.363	.813	.659
	Moderate Intensity Zumba	-6.695*	.814	.000
Low-Intensity Zumba	Moderate Intensity Zumba	-7.058*	.813	.000

Post-hoc analysis on adjusted posttest means of high-density lipoprotein showed a significant difference between the moderate-intensity Zumba group and the control, low-intensity Zumba group. The moderate-intensity Zumba group (MIZ) had a better effect on the high-density lipoprotein of sedentary women in Kerala.

Table III
Analysis of covariance of low-density lipoprotein (LDL) of the control group (CG), low-intensity Zumba group (LIZ) and high-intensity Zumba group (HIZ)

Group	Mean	Test	Sources of variance	Sum of squares	Mean square	df	F-ratio
CG	150.9	Pretest	between	0.67	.33	2	0.001
LIZ	150.8		within	1190.1	44.8	27	
MIZ	150.8						
CG	150.6	Posttest	between	668.5	334.2	2	12.187*
LIZ	150		within	740.5	27.4	27	
MIZ	140.3						
CG	150.6	Adjusted posttest	between	666.8	333.4	2	12.781*
LIZ	150		within	678.2	26.1	26	
MIZ	140.3						

*significant at 0.05 level (2,27df 3.37 & 2,26df 3.35)

As noted in Table III, the pretest F-ratio was below the significance threshold at the 0.05 level. However, the posttest and adjusted posttest F-ratios were higher than the required table value at the 0.05 significance level. Thus, the null hypothesis was rejected, indicating a significant difference between the groups' low-density lipoprotein (LDL) levels.

Table IV
Post-hoc analysis of adjusted posttest means of low-density lipoprotein (LDL) of the control group (CG), low-intensity Zumba group (LIZ) and high-intensity Zumba group (HIZ)

(I) Group LDL	(J) Group	Mean Difference (I-J)	Std. Error	Sig.
Control Group	Low-Intensity Zumba	.577	2.284	.803
	Moderate Intensity Zumba	10.277*	2.284	.000
Low-Intensity Zumba	Moderate Intensity Zumba	9.700*	2.284	.000

Post-hoc analysis of the adjusted posttest means for low-density lipoprotein (LDL) indicated a significant difference between the moderate-intensity Zumba and the control and low-intensity Zumba groups. The findings highlight that the moderate-intensity Zumba group (MIZ) substantially reduced LDL levels among sedentary women from Kerala.

Table V
Analysis of covariance of triglyceride (TG) of the control group (CG), low-intensity Zumba group (LIZ) and high-intensity Zumba group (HIZ)

Group	Mean	Test	Sources of variance	Sum of squares	Mean square	df	F-ratio
CG	190.5	Pretest	between	13.07	6.53	2	.424
LIZ	191.9		within	416.3	15.42	27	
MIZ	191.9						
CG	190.4	Posttest	between	13622.7	6811	2	188.246*
LIZ	191		within	976.9	36.2	27	
MIZ	145.5						
CG	190.7	Adjusted posttest	between	13655.3	6827.7	2	190.442*
LIZ	190.8		within	932.1	35.9	26	
MIZ	145.3						

*significant at 0.05 level (2,27df 3.37 & 2,26df 3.35)

Based on Table V, although the pretest F-ratio did not achieve significance at the 0.05 level, both the posttest and adjusted posttest values exceeded the critical table value at this level of significance. Consequently, rejecting the null hypothesis was justified, signifying a significant difference between the triglyceride (TG) levels groups.

Table VI
Post-hoc analysis of adjusted posttest means of triglyceride (TG) of the control group (CG), low-intensity Zumba group (LIZ) and high-intensity Zumba group (HIZ)

(I) Group Triglyceride	(J) Group	Mean Difference (I-J)	Std. Error	Sig.
Control Group	Low-Intensity Zumba	-.141	2.709	.959
	Moderate Intensity Zumba	45.359*	2.709	.000
Low-Intensity Zumba	Moderate Intensity Zumba	45.500*	2.678	.000

Post-hoc analysis of the adjusted post-test means for triglycerides indicated a notable difference between the moderate-intensity Zumba, control, and low-intensity Zumba groups. Specifically, the moderate-intensity Zumba group (MIZ) showed a more substantial reduction in triglyceride levels among sedentary women from Kerala.

Table VII
Analysis of covariance of cholesterol of the control group (CG), low-intensity Zumba group (LIZ) and high-intensity Zumba group (HIZ)

Group	Mean	Test	Sources of variance	Sum of squares	Mean square	df	F-ratio
CG	240.8	Pretest	between	1.07	.53	2	.007
LIZ	240.4		within	252.4	76.2	27	
MIZ	240.4	Posttest	between	1022.9	511.4	2	21.277*
CG	240.4		within	649	24	27	
LIZ	239.3		within	649	24	27	
MIZ	227.5	Adjusted posttest	between	1012.6	506.3	2	26.460*
CG	240.3		within	497.5	19.1	26	
LIZ	239.3		within	497.5	19.1	26	
MIZ	227.5	within	497.5	19.1	26		

*significant at 0.05 level (2,27df 3.37 & 2,26df 3.35)

As indicated in Table VII, the pretest F-ratio did not reach significance at the 0.05 level. However, the posttest and adjusted posttest values exceeded the critical table value at the 0.05 significance level. Therefore, rejecting the null hypothesis was justified, demonstrating a significant difference between the groups in cholesterol levels.

Table VIII
Post-hoc analysis of adjusted posttest means of cholesterol of the control group (CG), low-intensity Zumba group (LIZ) and high-intensity Zumba group (HIZ)

(I) Group	(J) Group	Mean Difference (I-J)	Std. Error	Sig.
Control Group	Low-Intensity Zumba	.991	1.957	.617
	Moderate Intensity Zumba	12.791*	1.957	.000
Low-Intensity Zumba	Moderate Intensity Zumba	11.800*	1.956	.000

Post-hoc analysis of the adjusted post-test means for cholesterol indicated a significant difference between the moderate-intensity Zumba and the control and low-intensity Zumba groups. Specifically, the moderate-intensity Zumba group (MIZ) demonstrated a more effective maintenance of cholesterol levels among sedentary women from Kerala.

Discussion

The HDL level of 58.2 mg/dl observed in sedentary women following moderate-intensity Zumba exercise exceeded the normal range of above 50 mg/dl, indicating improved HDL levels. The mean value decreased significantly from above 150 mg/dl to 140.3 mg/dl, contributing to lower blood LDL levels among sedentary women. Triglyceride levels were within the normal range at 145.3 mg/dl, falling below the borderline and high categories. Regarding cholesterol, levels reduced from 240 mg/dl to 227.5 mg/dl, within the normal range of 125-200 mg/dl. These improvements in lipid profiles were attributed to moderate-intensity Zumba exercise, which effectively decreased blood glucose and fat levels through increased calorie burning. Additionally, Zumba exercises, characterized by choreographed movements to rhythmic music, fostered psychological benefits through group dynamics. In conclusion, moderate-intensity Zumba exercises effectively maintain women's health by reducing cholesterol and triglyceride levels while enhancing overall fitness and psychological well-being.

Conclusion

The findings revealed that the moderate-intensity Zumba exercise group exhibited higher levels of high-density lipoprotein than the control and low-intensity Zumba exercise groups. Results indicated that the moderate-intensity Zumba exercise group demonstrated decreased levels of low-density lipoprotein compared to the control and low-intensity Zumba exercise groups. It was determined that the moderate-intensity Zumba exercise group maintained normal levels of triglycerides when compared to both the control and low-intensity Zumba exercise groups. The study concluded that the moderate-intensity Zumba exercise group showed reduced cholesterol levels relative to the control and low-intensity Zumba exercise groups.

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