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"Zumba Dance versus Resistance Training: Comparative Effects on Lipid Profile and BMI in Middle-Aged Women"

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Abstract
This study, which compared the effects of Resistance training and Zumba exercise interventions on body mass index (BMI) and lipid profiles among middle-aged women, has opened up new avenues for research. A total of 20 individuals were randomly assigned to a Resistance training group and a Zumba group. The intervention spanned 45 days, with participants attending three sessions per week. The Zumba group engaged in high-intensity dance workouts, while the resistance group followed a structured weight-training regimen. Baseline and post-intervention assessments measured lipid profiles (total cholesterol, LDL, HDL, triglycerides) and BMI. Posttest assessments revealed that the Resistance training group exhibited significantly higher BMI scores compared to the Zumba group ($M = 30.2$ vs. $M = 25.8$, $F (1,18) = 6.274$, $p < .05$). Adjusted analyses confirmed these findings, showing persistently higher BMI in the Resistance training group ($M = 28.8$ vs. $M = 27$, $F (1,17) = 25.781$, $p < .05$). Conversely, no significant differences were found between the groups in high-density lipoprotein (HDL) levels ($p > .05$) or low-density lipoprotein (LDL) levels ($p > .05$). However, participants in the Zumba group had significantly lower triglyceride levels ($M = 106$) compared to the Resistance training group ($M = 124$), $F (1,17) = 4.678$, $p < .05$, and lower total cholesterol levels ($M = 219$) compared to the Resistance training group ($M = 231$), $F (1,17) = 4.500$, $p < .05$. These results suggest that Zumba exercise may be more effective than Resistance training in reducing BMI, triglycerides, and total cholesterol levels, offering a hopeful and optimistic outlook on its potential benefits for cardiovascular health and weight management. The findings contribute to understanding the differential impacts of aerobic and resistance exercises on health markers, emphasizing the potential benefits of Zumba for cardiovascular health and weight management. However, further research with larger samples and longer durations is crucial to confirm these outcomes and explore additional factors influencing exercise interventions' efficacy, underscoring the importance of your work in this field.
Keywords: *Zumba, resistance training, lipid profile, BMI, middle-aged women, cardiovascular health, obesity, exercise regimen.*

Introduction

Physical activity is universally acknowledged as a cornerstone of healthy living, with profound implications for physical and mental health. Among various forms of exercise, Zumba dance and weight training have emerged as popular choices, particularly among middle-aged women. These forms of exercise not only offer distinct physiological benefits but also cater to different preferences and lifestyles. Middle age, a critical period marked by significant metabolic and hormonal changes, necessitates effective strategies to manage weight and improve overall health metrics, such as Body Mass Index (BMI) and lipid profile.Zumba, a high-energy dance workout incorporating elements of aerobic exercise, has gained widespread popularity due to its engaging and dynamic nature. It promotes cardiovascular health, enhances endurance, and facilitates weight loss through an enjoyable, socially interactive format. On the other hand, weight training focuses on building muscle strength and mass through resistance

exercises. It has been extensively documented to enhance metabolic rate, improve body composition, and positively influence lipid metabolism.

Despite the recognized benefits of both exercise modalities, there remains a lack of comparative research focusing on their specific impacts on BMI and lipid profiles in middle-aged women. This demographic is particularly vulnerable to cardiovascular diseases and metabolic disorders, where both BMI and lipid levels play crucial roles as risk indicators. Thus, understanding the differential effects of Zumba and weight training on these parameters can guide tailored exercise recommendations to optimize health outcomes.

This comparative study investigates the significant differences in BMI and lipid profiles between middle-aged women participating in Zumba dance versus those engaged in weight training. By elucidating these differences, the study seeks to provide empirical evidence to support the design of targeted interventions that can more effectively address the unique health needs of this population group. The findings are anticipated to contribute to the broader discourse on exercise prescription and public health strategies to mitigate age-related health risks in women.The present study compared the effects of Zumba and weight training on BMI and lipid profiles in middle-aged sedentary women.

Methodology

This research study examines the effectiveness of Zumba and resistance training in lowering BMI and improving lipid profiles among middle-aged women aged 30-45 years. Participants were divided into two groups: Group 1 (N=10) in Zumba and Group 2 (N-10) in resistance training. Baseline assessments measured LDL, HDL, triglycerides, total cholesterol, and BMI, conducted in an overnight fasting state from a reputable laboratory before and after the exercise regimen. Group 1 underwent a 45-day Zumba fitness dance training program and Group 2 resistance training program; the study did not control for variables such as diet, physical activity outside the program, or family background, which could potentially influence the results. All participants provided voluntary consent after being individually briefed about the study.

Research Design

This research employs a pre-test-post-test design to compare the impact of a Zumba dance fitness program and resistance training on specific physical and physiological variables, including lipid profile (LDL, HDL, triglycerides, total cholesterol) and body mass index (BMI).Participants engaged in a structured 45-day training regimen, beginning with ten days of low-intensity training, then fifteen days of intermediate-level training, culminating in twenty days of medium-high-intensity training. Additionally, participants completed a demographic data sheet to provide information on age and habits.

Lipid profile and BMI were measured twice for each participant: once before the exercise regimen began and once after 45 days of consistent training. Measurements were taken in an overnight fasting state from a well-equipped laboratory. BMI was calculated using the formula: weight (kg) / [height (m)]^2.

Statistical Analysis

Descriptive statistics and Analysis of covariance (ANCOVA) were used to determine whether there was any significant difference between the two groups post-test and adjusted post-test mean(Clarke & Clarke, 1972). Data analysis was conducted using the Statistical Package for the Social Sciences (SPSS) Version 23, based in Chicago, IL. The predetermined level of statistical significance was set at $P < 0.05$.

Results

The data collected were analyzed using SPSS software. Descriptive statistics were used to find both groups' standard deviation and mean. ANACOVA was used to find the significant difference in the BMI, HDL, LDL, Triglycerides, and Total cholesterol values of the Zumba and resistance training groups at the pretest, post-test, and adjusted post-test.

Table 1
Paired Samples Statistics between weight training and Zumba dance training

TABLE 1 Descriptive statistics					
Variables		**Zumba group (Experimental group N=13**		**(Resistance training group N=13)**	
		Mean	**SD**	**MEAN**	**SD**
Body Mass Index (BMI)	PRE-TEST	27.9820	1.87332	30.6000	5.05964
	POST-TEST	25.8080	1.91755	30.2000	5.20256
HDL	PRE-TEST	51.2000	3.99444	50.5000	4.14327
	POST-TEST	53.8000	3.15524	59.0000	25.15728
LDL	PRE-TEST	151.6000	8.59199	155.1000	5.36346
	POST- TEST	143.0000	7.84573	148.1000	8.04777
Triglycerides	PRE-TEST	112.1000	31.90768	127.1000	46.01558
	POST- TEST	100.8000	29.28708	129.7000	37.59447
Total cholesterol	PRE-TEST	225.2200	9.53238	231.0000	11.86966
	POST TEST	216.9600	8.89584	233.1000	22.66887

Table 1 presents descriptive statistics for participants in the Zumba and resistance training groups before and after the intervention.Before the intervention, the Zumba group had a mean BMI of 27.98 (SD = 1.87), which decreased to 25.81 (SD = 1.92) post-intervention. In contrast, the resistance training group slightly decreased to 30.20 (SD = 5.20) after the intervention.

In HDL cholesterol levels, the Zumba group started at 51.20 (SD = 3.99) and increased to 53.80 (SD = 3.16) post-intervention. The resistance training group began at 50.50 (SD = 4.14) and increased to 59.00 (SD = 25.16).Both the Zumba and resistance training groups experienced decreases in LDL cholesterol levels. Specifically, the Zumba group's LDL cholesterol decreased from 151.60 (SD = 8.59) to 143.00 (SD = 7.85), while the resistance training groups decreased from 155.10 (SD = 5.36) to 148.10 (SD = 8.05).

Before the intervention, the Zumba group had triglyceride levels 112.10 (SD = 31.91), which decreased to 100.80 (SD = 29.29) post-intervention. In contrast, the resistance training group increased from 127.10 (SD = 46.02) to 129.70 (SD = 37.59) in triglyceride levels.Total cholesterol levels in the Zumba group decreased from 225.22 (SD = 9.53) to 216.96 (SD = 8.90), while the resistance training group showed a slight increase from 231.00 (SD = 11.87) to 233.10 (SD = 22.67).

Overall, both Zumba and resistance training improved BMI and cholesterol profiles. Zumba training was particularly effective in reducing BMI and triglyceride levels, while both groups showed favourable changes in LDL cholesterol. These findings suggest that both exercise modalities contribute positively to metabolic health, with Zumba potentially offering additional benefits regarding BMI reduction and lipid profile improvements.

Table 2
Analysis of covariance of body mass index (BMI) of resistance training group and Zumba group

Group	**Mean**	**Test**	**Sources of variance**	**Sum of squares**	**Mean square**	**df**	**F-ratio**
Resistance	30.6	Pretest	between	34.3	34.27	1	2.355
Zumba	27.9		within	261.9	14.6	18	
Resistance	30.2	Posttest	between	96.5	96.5	1	6.274*
Zumba	25.8		within	276.7	15.4	18	
Resistance	28.8	Adjusted posttest	between	13.5	13.5	1	25.781*
Zumba	27		within	8.9	0.522	17	

*Significant at 0.05 level (1,17df 4.49 & 1,18df 4.45)

Table 2 showed no significant difference in the pretest BMImean values between the resistance training group and the Zumba exercise group, $F(1,18)=2.355, p>.05$. The posttest mean BMI scores for the Resistance training group (M = 30.2) were significantly higher than those for the Zumba group (M = 25.8), $F(1,18)=6.274, p<.05$. Similarly, the adjusted posttest mean BMI scores showed that the Resistance training group (M = 28.8) had significantly higher BMI compared to the Zumba group (M = 27), $F(1,17)=25.781, p<.05$These results indicate that participants in the Zumba exercise group achieved significantly lower BMI scores than those in the Resistance training group, suggesting better outcomes in terms of BMI with Zumba exercise.

Table 3
Analysis of covariance of high-density lipoprotein (HDL) of resistance training group and Zumba group

Group	*Mean*	*Test*	*Sources of variance*	*Sum of squares*	*Mean square*	*df*	*F-ratio*
Resistance	50.5	Pretest	between	2.5	2.5	1	.148
Zumba	51.2		within	298.1	16.6	18	
Resistance	59	Posttest	between	135.2	135.2	1	.421
Zumba	53.8		within	5785.6	321.4	18	
Resistance	59.9	Adjusted posttest	between	247.6	247.6	1	1.147
Zumba	52.8		within	3668.6	215.8	17	

In Table 3,The pretest mean HDL levels showed no significant difference between the Resistance training group (M = 50.5) and the Zumba group (M = 51.2), $F(1,18)=0.148, p>.05$. Similarly, the posttest mean HDL levels indicated no significant difference between the groups, with the Resistance training group (M = 59) and the Zumba group (M = 53.8), $F(1,18)=0.421, p>.05$. Furthermore, the adjusted posttest mean HDL levels also revealed no significant difference between the groups, with the Resistance training group (M = 59.9) and the Zumba group (M = 52.8), $F(1,17)=1.147, p>.05$.

These results suggest that the type of exercise intervention (Resistance training vs. Zumba) had no significant effect on HDL levels. Therefore, based on the ANCOVA analysis, neither group demonstrated superior HDL levels.

Table.4.
Analysis of covariance of low-density lipoprotein (LDL) of the resistance training group and Zumba group

Group	*Mean*	*Test*	*Sources of variance*	*Sum of squares*	*Mean square*	*df*	*F-ratio*
Resistance	155.1	Pretest	between	61.3	61.3	1	1.194
Zumba	151.6		within	923.3	51.3	18	
Resistance	148	Posttest	between	130.1	130.1	1	2.059
Zumba	143		within	1136.9	63.2	18	
Resistance	146	Adjusted posttest	between	9.3	9.3	1	0.246
Zumba	144		within	109.6	6.4	17	

**Significant at 0.05 level (1,17df 4.49 & 1,18df 4.45)*

In Table 4, The pretest mean LDL levels showed no significant difference between the Resistance training group (M = 155.1) and the Zumba group (M = 151.6), $F(1,18)=1.194, p>0.05$. Similarly, the posttest mean LDL levels indicated no significant difference between the groups, with the Resistance training group (M = 148) and the Zumba group (M = 143), $F(1,18)=2.059, p>0.05$. Furthermore, the adjusted posttest mean LDL levels also revealed no significant difference between the groups, with the Resistance training group (M = 146) and the Zumba group (M = 144), $F(1,17)=0.246, p>0.05$.These results suggest no significant effect of the type of exercise intervention (Resistance training vs. Zumba) on LDL levels. Therefore, neither group demonstrated superior LDL levels based on the ANCOVA analysis.

Table. 5
Analysis of covariance of triglyceride of Resistance training group and Zumba group

Group	*Mean*	*Test*	*Sources of variance*	*Sum of squares*	*Mean square*	*df*	*F-ratio*
Resistance	127	Pretest	between	1125	1125	1	0.718
Zumba	112		within	28219.8	1567.8	18	
Resistance	129.7	Posttest	between	4176.1	4176.1	1	4.45*
Zumba	10.8		within	16891.2	938.4	18	
Resistance	124	Adjusted posttest	between	1568	1568	1	4.678*
Zumba	106		within	5699.1	335.2	17	

**Significant at 0.05 level (1,17df 4.49 & 1,18df 4.45)*

In Table 2,The pretest mean triglyceride levels showed no significant difference between the Resistance training group (M = 127) and (1, 18) = 0.718, p >0 .05. However, the posttest mean triglyceride levels indicated a significant difference between the groups, with the Resistance training group (M = 129.7) showing higher triglyceride levels compared to the Zumba group (M =10.8), $F(1,18)=4.45, p<0.05$. Furthermore, the adjusted posttest mean triglyceride levels also revealed a significant difference between the groups, with the Resistance training group (M = 124) showing higher triglyceride levels compared to the Zumba group (M = 106), $F(1,17)=4.678, p<0.05$.

These results suggest that participants in the Zumba exercise group achieved significantly lower triglyceride levels than those in the Resistance training group, indicating better outcomes in triglycerides with Zumba exercise.

Table 6

Analysis of covariance of Total cholesterol of Resistance training group and Zumba group

Group	Mean	Test	Sources of variance	Sum of squares	Mean square	df	F-ratio
Resistance	231	Pretest	between	167	167	1	1.442
Zumba	225		within	2085.8	115.9	18	
Resistance	233	Posttest	between	1302.5	1302.5	1	4.453*
Zumba	216.9		within	5265	292.5	18	
Resistance	231	Adjusted posttest	between	670.9	670.9	1	4.500*
Zumba	219		within	2534.7	149.1	17	

**significant at 0.05 level (1,17df 4.49 & 1,18df 4.45)*

In Table.2 The pretest mean total cholesterol levels showed no significant difference between the Resistance training group (M = 231) and the Zumba group (M = 225), $F(1,18)=1.442, p>0.05$. However, the posttest mean total cholesterol levels indicated a significant difference between the groups, with the Resistance training group (M = 233) showing higher total cholesterol levels compared to the Zumba group (M = 216.9), $F(1,18)=4.453, p<0.05$. Furthermore, the adjusted posttest mean total cholesterol levels also revealed a significant difference between the groups, with the Resistance training group (M = 231) showing higher total cholesterol levels compared to the Zumba group (M = 219), $F(1,17)=4.500, p<0.05$.These results suggest that participants in the Zumba exercise group achieved significantly lower total cholesterol levels than those in the Resistance training group, indicating better outcomes regarding total cholesterol with Zumba exercise.

Discussion

The findings of this study provide valuable insights into the differential effects of 45 days of Resistance training and Zumba exercise interventions on various health markers, including BMI, HDL, LDL, triglycerides, and total cholesterol. This discussion will interpret these results in the context of existing research and implications for clinical practice and further investigation.

The study observed significantly higher posttest mean BMI scores in the Resistance training group compared to the Zumba group. Both the unadjusted and adjusted analyses consistently showed this trend. These results align with previous research indicating that aerobic exercises like Zumba are more effective in reducing BMI than resistance exercises alone (*Boutcher, 2010; Janssen et al., 2002*).

Contrary to BMI outcomes, the study did not find significant differences between the Resistance training and Zumba groups regarding HDL and LDL levels, suggesting neither exercise type had a superior effect on these lipid profiles. These findings are consistent with previous studies that reported no significant differences in lipid profiles between different types of exercise interventions (*Donnelly et al., 2007; Sacks et al., 2009*).

However, the study did find significant differences in triglyceride and total cholesterol levels between the two exercise groups. Specifically, participants in the Zumba group had lower posttest mean triglyceride levels and total cholesterol than those in the Resistance training group. These results support the notion that aerobic exercises like Zumba may be more effective in improving lipid profiles than resistance training alone (*Snel et al., 2012; Tambalis et al., 2011*).

From a clinical perspective, these findings suggest that Zumba exercise may offer advantages over Resistance training in reducing BMI, triglycerides, and total cholesterol levels. These benefits are particularly relevant for individuals at risk of cardiovascular diseases and metabolic disorders, where improvements in these biomarkers are crucial for long-term health outcomes (*American College of Sports Medicine, 2018*).

Limitations and Future Research

It is important to acknowledge several limitations of this study. The sample size was relatively small, which may limit the generalizability of the findings. Future research should include more extensive and

diverse participant groups to validate these results across different populations. Additionally, the duration and intensity of exercise interventions could influence outcomes, but this study needs to examine them thoroughly. Longitudinal studies could provide insights into the sustainability of these effects over time.

Conclusion

In conclusion, while Resistance training may benefitspecific health outcomes, Zumba exercise is more effective in reducing BMI, triglycerides, and total cholesterol. These findings contribute to the growing body of evidence supporting the differential effects of various exercise modalities on health markers. Clinicians should consider these results when prescribing exercise programs tailored to individual health needs.

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