

ORIGINAL ARTICLE

EFFECT OF LOW-IMPACT AEROBIC DANCE AND ZUMBA EXERCISES ON BODY FAT PERCENTAGE IN OBESE WOMEN

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ABSTRACT

The purpose of this study was to examine the effect of low-impact aerobic dance and zumba exercises in reducing the percentage of body fat in obese women in terms of the Body Mass Index (BMI). Forty obese women (mean age 33.9±7.1 years) were selected and divided into two experimental groups, namely: low-impact aerobic dance (n=20) and zumba (n=20). The participants were also divided based on the BMI which gave the mild and severe obesity groups. The research instrument was a skinfold caliper which was used to measure the thickness of the body fat. The experiment was carried out 3 times a week for 8 weeks and the participants from both groups performed exercises for a duration of 60 minutes. The analysis of data between the experimental groups showed that there were significant differences between these exercises ($r=0.005$; $p<0.05$), the levels of obesity ($r=0,000$; $p<0.05$), and there were interactions between the exercises and the levels of obesity ($r=0,000$; $p<0,05$), from the pre-test to the post-test. The results showed that low-impact aerobic dance was more effectively used in reducing the percentage of body fat in obese women at the severe levels while zumba was effectively used in reducing the percentage of body fat in obese women with mild obesity, therefore the two exercises had an influence in reducing the percentage of body fat.

Keywords: Low-impact aerobic dance, zumba, body mass index, body fat percentage, obese women

INTRODUCTION

Obesity is a problem affecting many countries of the world irrespective of their levels of development.^{1,2,3} And it is the major public health condition with comorbidities leading to reduction in life expectancy.⁴ Therefore, obesity should not only be seen as a condition that develops through an unhealthy lifestyle but one which creates a significant risk to health. Approximately 1.2 billion people in the world are overweight and at least 300 million of them are obese.⁵ This is a major threat to public health because it increases the risk of some chronic diseases.³ Thus, it is one of the problems that need serious attention. Unhealthy food intake such as those with low nutrient density, sweet drinks and the likes, lead to the condition while changes in eating and snacking at home, improved sedentary lifestyles and the likes are some of the things that can get rid of it within the population.^{3,6,7,8}

Exercise is also like a medicine in that it has an appropriate dosage, indication, contraindication, and adverse effect associated with its use. The importance of proper technique in strength training and flexibility exercise, the appropriate guidance in aerobic activity progression, and the role of kinetic chain and movement pattern analysis are all essential to an accurate and safe exercise prescription for obese persons.⁹

Looking at the state of sport development today, it is in an advanced state, especially the aerobic dance that is common among mothers and young women. Basically, gymnastics is an effective means of rehabilitation or therapy and it is a physical exercise for preventing the accumulation of weight which also helps in losing it. Other benefits this gives the body include increasing the work rate of the heart, increasing muscle strength, burning fat, etc. Aerobic dance is one of the most common exercise practices in the world.^{10,11} This is because there have been many gymnastic club that have been established and now almost every agency or office also organizes aerobic dance exercise.

The fact that low-impact aerobic dance exercise has been well adapted to keep and improve health in a wide range of the population.¹² And that regular aerobic dance exercise can prevent obesity and build muscle. Zumba is a dance-based aerobic activity based on a variety of Latin dance styles (salsa, reggaeton, cumbia, etc.) and including steps in multiple directions.¹³ Also, it is an alternative aerobic dance activity that helps the body in burning excessive fats and a systematic review has shown that zumba has beneficial effects on reducing body weight.¹⁴ Therefore, both exercises help in reducing the body fat percentage.

The World Health Organization (WHO) recommended the body mass index (BMI) as a

simple marker to reflect total body fat and is used as a measure of overweight and obesity.¹⁵ This can also be used to determine the ideal body weight. The relationship between BMI, body fat percentage (BF %) and body fat distribution were different between populations.^{15,16} Hence, the subjects in this study were grouped based on those that have mild or severe obesity by calculating the BMI of each participant.

The aim of this study is to therefore examine whether low-impact aerobic dance and zumba exercises have an effect in reducing the body fat percentage of obese women and which of these exercises is effective to be applied in reducing body fat percentage in mild and severe obese women. The hypothesis of this study is that low-impact aerobic dance and zumba exercises have an effect on decreasing the body fat percentage of obese women and severe obese women are more effective using low-impact aerobic dance exercise, whereas mild obesity women are more effective using Zumba exercise.

METHODOLOGY

The participants were consisting of 40 obese women with an mean age of 33.9 ± 7.1 years. These were all members of a gymnastic club and were selected based on the assessment of the researcher by conducting tests and measurements to determine the BMI of these participants. These were then categorized into the obese group with mild and severe levels. Also, they were divided into two groups: low-impact aerobic dance and zumba exercises. The researcher fully explained the research objectives, procedures and benefits to the participants before asking this group to sign the given official written approval for the implementation of the exercise program.

Before the 8 weeks of experimental period, participants' anthropometric measurements such as body height, weight and percentage of body fat were carried out.¹⁷ The mechanical scales (SMIC ZT-120), were used to measure the height and weight while the percentage of body fat was measured with a device of skinfold caliper in millimeters (mm). Skinfold Caliper is a device which measures the thickness of a fold of skin with its underlying layer of fat.¹⁸ And the body parts were measured using the Jackson and Pollock Skinfold Test technique which measures 3 parts which are the triceps, thigh and suprailium.¹⁹ The measurement of body fat percent with precise methods is critical.²⁰

The measured height and weight were used in calculating the BMI which is then used in grouping the levels of obesity. This grouping is based on the BMI classification for adults in Indonesia which is in accordance with the Decree of the Minister of

Health No. 41/2014 concerning the Balanced Nutrition Guidelines as shown in Table 1.

Table 1. Classification of BMI indicators for Indonesian adults

Classification	Category	BMI (kg/m ²)
Thin	Mild thin	<17.0
	Severe thin	17.0 - 18.5
Normal	Mild	18.5 - 25.0
	Severe	>25.0 - 27.0
Fat	Mild obesity	>27.0
	Severe obesity	>27.0

(Minister of Health Decree No. 41/2014 concerning Guidelines for Balanced Nutrition)

A pre-test was carried out to measure body fat percentage by the Jackson and Pollock Skinfold Test technique before the experiment was carried out. The tricep folds are taken in a vertical direction directly in the middle of the arm back, the suprailiac folds are taken horizontally while the thigh fold is taken vertically at the front.¹⁸ Then the exercise program is carried out.

Low-impact aerobic dance. The exercise programme was choreographed and led by certified aerobics instructors.²¹ The instructors should be experienced and accustomed to teaching low-impact aerobic dance for adults.¹² Prior to this, the researcher explained to the participants the procedures for implementing this treatment after which the consent form was filled. The treatment period was made up of 3 sessions in a week for 8 weeks and each session lasted for 1 hour including 10 - 15 minutes warm-up phase, 30 - 35 minutes low-impact aerobic dance exercise, and ends with a 5 - 10-minute cooling phase. All these were done in a closed room.

Zumba. All classes/ exercise program was led by a certified Zumba Fitness® instructor (ZIN)²² and just like what was done in the low-impact aerobic dance exercise, the researcher explained the procedures for implementing the treatment, its duration and location to the participants. On completing the treatment, the final data collection, which is the post-test, is carried out. Therefore, both the initial data (pre-test) and final data (post-test) were collected for the purpose of this study.

Design and Procedures

This is an experimental study with a quantitative approach which aims at comparing two different treatments to the subjects by factorial design techniques. It used the pre-test and post-test design group method extracted from 1 pre-test stage with 8 weeks of treatment, and 1 post-test stage. Each group was then treated with low-

impact aerobic dance and zumba exercises within a duration of 60 minutes. Both are carried out 3 times a week for 8 weeks by gymnastic instructors who are experts in their respective fields. The data were also collected with the assistance of people who are experts in the use of research instruments.

Statistical Analysis

The statistical analysis was carried out with the use of SPSS for Windows version 21 using the Two-way Variant Analysis (ANOVA) at the significance level $\alpha = 0.05$. To fulfill the assumptions in the ANOVA technique, it is necessary for the data to meet the analysis prerequisites which include both the normality test and the homogeneity test. The *One-Sample Kolmogorov-Smirnov Test* method was used for the normality test while the homogeneity testing was done using the *Levene Test*. Furthermore, different tests were carried out for each treatment group with the *Paired Samples T-Test* and hypothesis testing.

RESULT

The physiological characteristics in each group are shown in Table 2 and the results of the intergroup analysis in Table 3. The results obtained in the pre-test and post-test were analyzed using the SPSS and there was a decrease in body fat percentage for each treatment group.

Gain scores for pre-test and post-test body fat percentage in the low-impact aerobic dance exercise group with mild obesity women ($\bar{x}=2.56$, $sd=0.44$), low-impact aerobic dance exercise group with severe obese women experienced a significant decrease ($\bar{x}=4.62$, $sd=0.62$), zumba exercise group with mild obesity women ($\bar{x}=3.02$, $sd=0.15$), and zumba exercise group with severe obesity women ($\bar{x}=2.64$, $sd=0.48$). The results of the data analysis for the prerequisite tests of normality and homogeneity are shown in Tables 4 and 5 respectively. The Paired Samples T-Test in the low-impact aerobic dance and zumba exercises groups gave the same results, $r=0.000$ ($p<0.05$) while the results of the hypothesis testing on exercise types analysis ($r=0.005$; $p<0.05$), obesity levels ($r=0.000$; $p<0.05$), and types of exercise with obesity level ($r=0.000$; $p<0.05$). The flow of research can be seen in Figure 1.

DISCUSSION

This study examined the effect of two types of exercises in reducing the percentage of body fat in obese women and the exercise programs that were employed in achieving this are the low-impact aerobic dance and zumba. The participants were selected based on BMI and divided into two groups: women with mild obesity and those with severe obesity. After 8 weeks of treatment in each group, these were the findings: a) low-impact aerobic dance and zumba exercises have an effect in reducing the percentage of body fat in obese women, b) low-impact aerobic dance exercise effectively reduce the percentage of body fat in severely obese women, and c) zumba exercise is effective in reducing the percentage of body fat in mildly obese women. The low-impact aerobic dance exercise emphasizes fat burning and changes in body composition such that those who are overweight reduce in weight on their joints and is more effective in burning fat. However, the zumba training system is interspersed with breaks therefore the intensity of the exercise is not stable and the fat burning process is less optimal. Zumba movement is a combination of several dances, so for gymnastic members, who have a body with excess body weight or beginners, it will be difficult to follow the movements.

This is in line with previous findings that moderate intensity aerobic dance (for 6 weeks) was able to reduce fat in overweight and obese women.²³ Zumba presents a reduction in general body fat, increase in muscle mass, statistically significant changes in body composition, and a reduction in the total fat mass which is influenced by the duration of the intervention.²² Because zumba has an impact on greater energy that has been spent,^{14,24} majority of studies describe a mild to moderate decrease in body weight when employed.²⁵⁻²⁹ Another study revealed that zumba exercise release energy at 369 Kcal within a duration of about 39 minutes, and that a longer duration would obviously result in greater energy spent³⁰ and depending on the type of dance style performed.^{30,31}

Table 2. Characteristics of participants in each group

	Low-impact aerobic dance	Zumba	Mild obesity women	Severe obesity women
Height (cm)	155.9 ± 4.9	156.4 ± 4.9	156.9 ± 4.5	155.4 ± 5.2
Weight (kg)	69.7 ± 6.1	69.4 ± 6.8	65.2 ± 3.9	73.9 ± 5.4
Body Mass Index (kg/m ²)	28.7 ± 2.9	28.3 ± 2.2	26.5 ± 0.4	30.6 ± 1.9

Values are given as mean ± standard deviation

Table 3. Results of pre-test and post-test body fat percentage in each experimental group

	a1b1		a1b2		a2b1		a2b2	
	Pre	Post	Pre	Post	Pre	Post	Pre	Post
Min	31.70	29.70	33.40	29.90	33.50	30.20	33.40	29.90
Max	38.70	35.00	39.40	34.30	39.40	36.60	36.60	34.30
Mean	35.30	32.74	36.57	31.95	36.85	33.83	35.14	32.50
Sd	2.27	1.83	1.98	1.36	1.76	1.91	1.36	1.84

Table 4. The data normality test results in each experimental group

	a1b1	a1b2	a2b1	a2b2
Pre	0.974	0.998	0.907	0.699
Post	0.821	0.999	0.933	0.778

Significance p > 0.05

Table 5. Test results on the data homogeneity of low-impact aerobic dance and zumba exercises

	Low-Impact Aerobic Dance		Zumba	
	Pre	Post	Pre	Post
Sig.	0.598	0.307	0.541	0.839

Significance p > 0.05

The success achieved in reducing the percentage of body fat is influenced by the ability of participants to deal with the gymnastic movements in an integrated and harmonious manner. The level of obesity here is determined by BMI and BMI is usually considered a surrogate marker of excess adiposity in terms of overweight and obesity.^{32,33,34} This, in a way, can influence the success in reducing the percentage of the body fat because by knowing the BMI, participants are able to control the movements that are completed thereby becoming more accurate. And according to the results of this research, gymnastic group in severe obese women has a faster effect in reducing the percentage of the body fat compared to women with mild obesity.

Although this study has a good influence in reducing the percentage of body fat in obese women, there are still limitations. One of them is the fact that researchers are less able to control the daily diets and the activities of the participants. Also, the number of participants was only equaled on the average with those of the previous studies and the duration of the experiment was only 8 weeks, which is similar to the research that had been done. This duration of the study is relatively short in determining the decrease in the percentage of body fat. Therefore, the number of participants can be multiplied and the treatment time can also be extended in future research. Also, researchers put some measure in place to control the daily diets and activities of the participants.

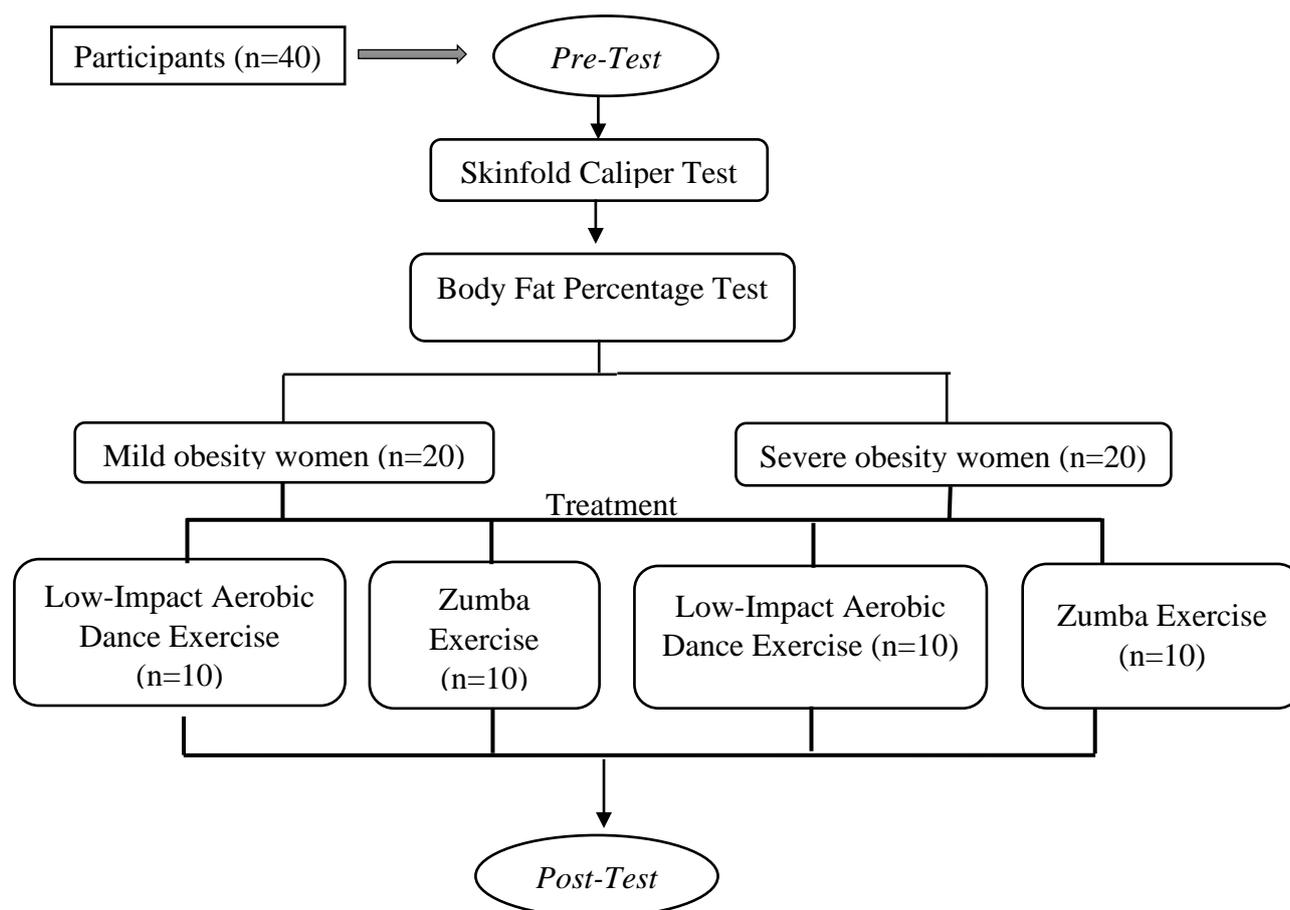


Figure 1. Research Flow

CONCLUSION

The data from this study showed that low-impact aerobic dance and zumba exercises have a significant effect in reducing the percentage of body fat in obese women. However, the low-impact aerobic dance exercise is more effectively applied in the obese group at the severe level because it has a more significant influence on the group, while zumba exercise has a more effect on the mild obese group. On the application of the two types of exercise, it turns out that there are other factors that influence the reduction in the percentage of body fat such as body mass index which, in this case, is mild and severe obesity. And as an instructor or trainer, more attention should be given to body mass index factor in an event of reducing the percentage of body fat.

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