Effects Of Eight-Week Zumba Fitness Intervention On The Selected Physiological Variable Of Overweight Female

Dr. Bidya Roy, Mr Samaresh Jana

Assistant Professor, Department Of Physical Education And Sports Science, Visva-Bharati University, Bolpur Santiniketan, West Bengal, India, Email: Bidyaroy1988@Gmail.Com. Orcid – 0009-0002-6590-8602
Sact (State Aided College Teacher), Department Of Physical Education, Silda C.S College (Affiliated To Vidyasagar University), West Bengal, India, Email: Samareshj9@Gmail.Com. Orcid- 0009-0005-2964-2968.

Abstract

*The purpose of the study was to determine the effects of an Eight-week Zumba fitness intervention on the Body Mass Index (BMI), Resting Heart Rate (RHR), and Blood Glucose Level (BGL) of overweight middle-aged women. The experimental method was used for this study which utilized the pre-test and post-test research design. A total of thirty (**30**) participants formed the sample for the study. They were selected using a purposive sampling technique. The samples were selected from the overweight middle-aged women Teaching Staff Govt. School Bolpur, Bolpur, Santiniketan, W.B, and (India). Overweight middle-aged women were identified using their Body Mass Index. Fifteen (**n=15**) participants formed the experimental group, while fifteen (**n=15**) formed the control group. A pre-test was conducted for the two groups on their BMI, resting heart rate, and blood glucose level. The experimental group went through a Zumba fitness intervention for a period of Eight weeks, while the control groups were asked to continue with their daily routine. A post-test was conducted for the two groups after Eight weeks to determine the effects of the eight-week Zumba fitness intervention on BMI, resting heart rate, and blood glucose level. Data from the experiment conducted was analyzed using the descriptive statistics of percentages, mean, and standard deviation. The hypotheses were tested using the inferential statistics of the t-test at 0.05 alpha level. Three hypotheses tested were significant, which implies that Eight weeks of Zumba fitness intervention had a significant effect on the BMI, RHR, and BGL of overweight middle-aged women. It is recommended that individuals take part in Zumba fitness intervention 3-4 days a week in other to eliminate cardiovascular risk factors.*

Keywords: *Middle Aged Women, Govt. School, Teaching Staff, Zumba fitness intervention, Body mass index, Resting Heart Rate, and Blood Glucose Level.*

I. Introduction

The increase in body weight and obesity is posing a real threat to health both in children as well as adults all over the world. Obesity has become a serious health problem in developed as well as developing countries. The prevalence of obesity in women exceeds that in men. Overweight and obesity are risk factors for cardiovascular diseases, certain types of cancers, type 2 diabetes, hypertension, osteoarthritis, gallstones, dyslipidemia, and musculoskeletal problems. Simple anthropometrical measurements are taken to rule out obesity and are more practical both in clinical practice and for large-scale epidemiological studies.

In 2022, 2.5 billion adults aged 18 years and older were overweight, including over 890 million adults who were living with obesity. This corresponds to 43% of adults aged 18 years and over (43% of men and 44% of women) who were overweight; an increase from 1990, when 25% of adults aged 18 years and over were overweight. Prevalence of overweight varied by region, from 31% in the WHO Southeast Asia Region and the African Region to 67% in the Region of the Americas.

About 16% of adults aged 18 years and older worldwide were obese in 2022. The worldwide prevalence of obesity more than doubled between 1990 and 2022.

In 2022, an estimated 37 million children under the age of 5 years were overweight. Once considered a high-income country problem, overweight is on the rise in low- and middle-income countries. In Africa, the number of overweight children under 5 years has increased by nearly 23% since 2000. Almost half of the children under 5 years who were overweight or living with obesity in 2022 lived in Asia.

Over 390 million children and adolescents aged 5–19 years were overweight in 2022. The prevalence of overweight (including obesity) among children and adolescents aged 5–19 has risen dramatically from just

---

8% in 1990 to 20% in 2022. The rise has occurred similarly among both boys and girls: in 2022 19% of girls and 21% of boys were overweight.

While just 2% of children and adolescents aged 5–19 were obese in 1990 (31 million young people), by 2022, 8% of children and adolescents were living with obesity (160 million young people).

Zumba is a mixture of a dance style and a fitness workout. The dance originated in Colombia in the 90s, when the fitness trainer Alberto "Beto" Perez played Latin American music for the first time during an aerobics class. Zumba dancing is a mixture of aerobics and several Latin American dances. The name is Zumba comes from Colombian, where it means something like **"having fun" or "moving fast"**. Perez subsequently even patented the word and the newly acquired dance and has been **very** successful with it.

Zumba tends to appeal to a predominantly female audience, but all are welcome. And because the choreography is more-or-less accessible even to those with "two left feet," people of all ages and dance abilities have flocked to the classes, especially during the peak of its popularity between 2005 and 2015. As a result, the brand added numerous programs to make the class and choreography even more accessible to people of all ages, genders, and fitness levels. Classes include:

Aqua Zumba: Perfect for those with lower-extremity injuries or needing low-impact exercise, Aqua Zumba takes the Latin dance craze to the pool.

Zumba Gold: This modified version of the standard Zumba class is geared to an older audience that wants the same fun music and flair as a traditional class but performed at a lower intensity.

Zumba Kids: Designed for kids between 7 to 11 years old, Zumba Kids modifies and breaks down traditional Zumba moves, then adds games and activities to the class to keep kids engaged and interested as they break a sweat.

Zumba Kids Jr.: Similar to Zumba Kids, Zumba Kids Jr. is modified for the 4- to 6-year-old audience and is positioned even more as a "dance party" to help keep this age group on "task."

Zumba Step: The same Latin-inspired dance choreography, but with the addition of an aerobic step to increase the intensity of the workout and add more leg-strengthening moves due to repeatedly stepping on and off the elevated surface

Zumbini: This once-a-week, 45-minute class is designed for the littlest Zumba fans between 0 and 3 years old; the little ones and their caregivers meet to bond over music and engage in age-appropriate active play; think less "workout" and more "learning experience."

Zumba targets lots of different muscle groups at once for total body toning. Boosts your heart health. You not only get aerobic benefits (it gets your heart rate up), but you also get anaerobic benefits – the kind that helps you maintain a good cardiovascular respiratory system.

The Zumba formula is 70% Latin music and 30% of anything else. A typical Zumba® class will feature merengue, salsa, cha-cha, reggaeton, bachata, samba, soca, hip-hop, belly dance, and bhangra. The overall effect is that exercise feels more like a party than working out at the gym.

Zumba dances are usually done with oxygen use and they can be performed indoors or outdoors. Zumba dance could also be of high or low impact and this type of activity has been proven by several researchers as beneficial to the overall health and well-being of individuals, especially overweight people as it helps to reduce excessive body weight and certain risk factors for hypertension, diabetics, among others. There is little research documented on the effects of Zumba dance on the body mass index, resting heart rate, and blood glucose level of overweight female administrative staff. Therefore, the need to examine the effect of an Eight-week Zumba Dance fitness on Body Mass Index, Resting Heart Rate, and Blood Glucose Level of overweight middle-aged women Teaching Staff Govt. School Bolpur.

Purpose

The purpose of the study was to see the effects of Zumba dance fitness on the Body Mass Index, Resting Heart Rate, and Blood Glucose level of overweight middle-aged women Teaching Staff Govt. School Bolpur, Santiniketan (W.B) India.

Hypotheses

It was hypothesized that:

Eight weeks of Zumba fitness intervention might not have a significant effect on the body mass index (BMI), resting heart rate (RHR), and blood glucose level (BGL) of overweight middle-aged women Teaching Staff Govt School Bolpur.

II.   Methodology

Selection of the Subjects
This study includes a total of Thirty (30) women subjects. Zumba experimental group (n-15 subjects were selected) and A control group (n-15 subjects were selected). One group consisted of Zumba fitness intervention, whereas the other group consisted of a daily routine (no Zumba)

Sampling technique
For this study, thirty (30) women subjects were selected in a purposive sampling technique. The average subject's age ranged from about 42 to 45 years.

Selection of variables
Dependent variables: Selected parameters, i.e., Body Mass Index (BMI), Resting Heart Rate (RHR), and Blood Glucose Level (BGL).

Independent variables: Zumba intervention on the selected group of overweight middle-aged women Teaching Staff Govt. School Bolpur.

Selected parameters, test item, instrument & scoring/unit

Table-1 Parameter

Parameters	Test item	Instrument	Scoring /unit
BMI	Body Mass Index	Steel tape, Weighing machine	Kg/mt^2
RHR	Resting Heart Rate	Stopwatch	Beats/minute
BGL	Blood Glucose Level	Using Omron HGM112 Glucometer	Mg/Dl

Data collection procedure
1. Measure the Body Mass Index
Manually weight in kilogram and height in $meter^2$

2. Measure the Resting Heart Rate
Manually RHR counted in a fully resting position, according to the (Mc Ardle-Ketch procedure) in a lying resting position.

3. Measure the Blood Glucose Level
This BGL test maintains the Omron HGM112 Glucometer.

Statistical analysis
Data from the experiment conducted was analyzed using the descriptive statistics of frequency, percentages, mean, and standard deviation. Also, the normality of the data was analyzed using the Shapiro-Wilk test, and the data was found to be homogeneous Followed normality where the p-value was found 0.90 (p >0.05), thus parametric statistics were undertaken and the hypotheses were tested using the inferential statistics of paired t-test at a 0.05 level of significance. Also, the normality of the data was analyzed using the Shapiro-Wilk test, and the data was found to be homogeneous Following normality where the p-value was found 0.90 (p >0.05)

III.   Results
Table 2: Physical and Physiological Data of Respondents

Variables	N	Mean	S. D
Age (years)	30	43.12	2.57
Height(cm)	30	151.51	15.52
Weight(kg)	30	67.34	7.57
Blood Glucose Level(mg/dl)	30	75.43	2.89
BMI (kg)	30	26.88	2.23
Resting Heart Rate (bpm)	30	73.74	5.86

Table 2 shows that the participants had a mean age of 43.12 years. The table also shows the mean height of participants as 151.51cm. It can also be observed from the table that the participants had a mean weight of 67.43 kg, a mean blood glucose level of 75.43mg/dl, a mean BMI of 26.88 kg/m, and a mean resting heart rate of 73.74 beats per minute.

Table 3: Effect of Eight Weeks Zumba Fitness Intervention on Blood Glucose Level

Experimental Group	Mean	N	S. D	Df	t-calc	t-crit	Remark
Glucose Level Pre-Test	73.98 mg/dl	15	2.06	13	2.21	1.77	Significant
Glucose Level Post-Test	71.84 mg/dl	15	1.62				
Control Group	Mean	N	S. D	Df	t-calc	t-crit	Remark
Glucose Level Pre-Test	73.81 mg/dl	15	2.93	13	0.372	1.77	Not Significant
Glucose Level Post-Test	74.35 mg/dl	15	2.69				

Table 3 above shows that the t-calc value of 2.21 is greater than the t-crit value of 1.77 at a 0.05 level of significance for the experimental group pre-test and post-test while the t-calc value of 0.372 is lesser than the t-crit value of 1.77 for the control group pre-test and post-test. Therefore, the null hypothesis is rejected. This implies that Eight weeks of Zumba fitness intervention has a significant effect on the blood glucose level of overweight middle-aged women Teaching Staff Govt. School Bolpur.

Table 4: Effect of Eight Weeks Zumba Fitness Intervention on BMI

Experimental Group	Mean	N	S. D	Df	t-calc	t-crit	Remark
BMI Pre-Test	26.10kg/m^2	15	1.48	13	4.08	1.77	Significant
BMI Post-Test	22.92 kg/m^2	15	1.53				
Control Group	Mean	N	S. D	Df	t-calc	t-crit	Remark
BMI Pre-Test	26.51 kg/m^2	15	1.45	13	0.267	1.77	Not Significant
BMI Post-Test	26.71 kg/m^2	15	1.44				

Table 4 above shows that the t-calc value of 4.08 is greater than the t-crit value of 1.77 at a 0.05 level of significance for the experimental group pre-test and post-test while the t-calc value of 0.267 is lesser than the t-crit value of 1.77 for the control group pre-test and post-test. Therefore, the null hypothesis is rejected. This implies that Eight weeks of Zumba fitness intervention has a significant effect on the body mass index of overweight middle-aged women Teaching Staff Govt. School Bolpur.

Table 5: Effect of Eight Weeks Zumba Fitness Intervention on Resting Heart Rate

Experimental Group	Mean	N	S. D	df	t-calc	t-crit	Remark
Resting H.R Pre-Test	74.50 bpm	15	3.02	13	4.41	1.77	Significant
Resting H.R Post-Test	68.57 bpm	15	1.98				
Control Group	Mean	N	S. D	Df	t-calc	t-crit	Remark
Resting H.R Pre-Test	74.50 bpm	15	3.02	13	1.41	1.77	Not Significant
Resting H.R Post-Test	72.42 bpm	15	2.63				

The table above shows that the t-calc value of 4.41 is greater than the t-crit value of 1.77 at a 0.05 level of significance for the experimental group pre-test and post-test while the t-calc value of 1.41 is lesser than the t-crit value of 1.77 for the control group pre-test and post-test. Therefore, the null hypothesis is rejected. This implies that Eight weeks of Zumba fitness intervention has a significant effect on the resting heart rate of overweight middle-aged women Teaching Staff Govt. School Bolpur.

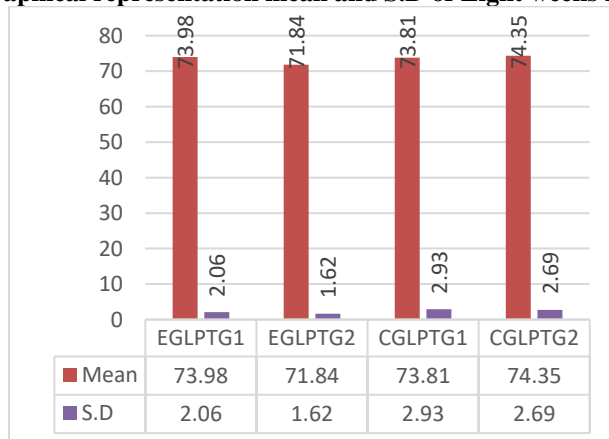**Graphical representation mean and S.D of Eight weeks Zumba fitness Intervention**

	EGLPTG1	EGLPTG2	CGLPTG1	CGLPTG2
Mean	73.98	71.84	73.81	74.35
S.D	2.06	1.62	2.93	2.69

Figure - 1

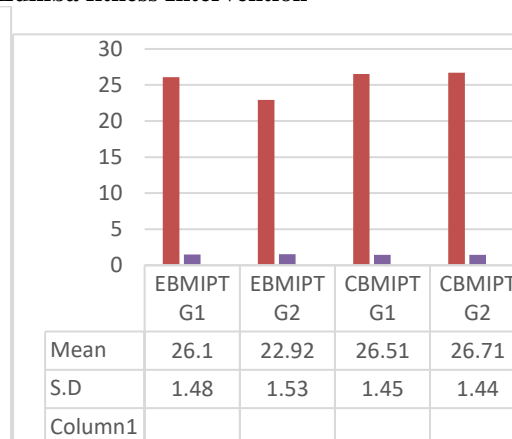|	EBMIPT G1	EBMIPT G2	CBMIPT G1	CBMIPT G2
Mean	26.1	22.92	26.51	26.71
S.D	1.48	1.53	1.45	1.44
Column1				

Figure - 2

Graphical Representation of Mean and Graphical Representation of Mean and S.DS.D for BGL of overweight middle-aged for BMI of overweight middle-aged Women Teaching Staff Govt. School Bolpur Teaching Staff Govt. School Bolpur
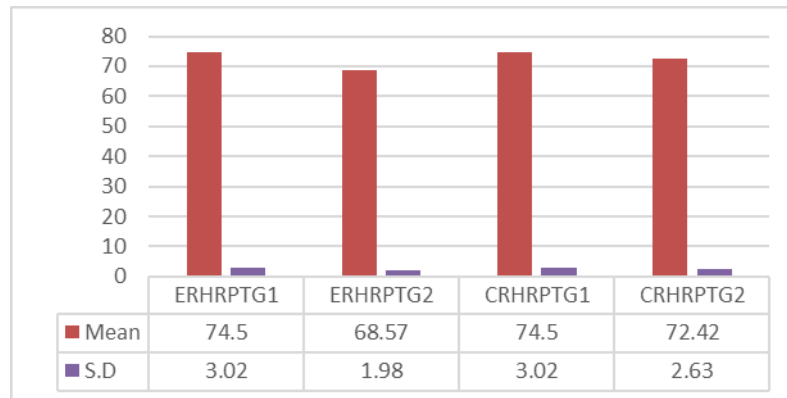
Figure - 3
Graphical Representation of Mean and SD for RHR of overweight middle-aged women teaching Staff Govt.
School Bolpur.

IV.   Discussion Of Findings

The results of hypothesis testing on effects of a zumba fitness intervention on the blood glucose level of overweight middle-aged women teaching staff Govt. School Bolpur. Using the inferential statistics of paired sample t-test concluded that Eight weeks of Zumba fitness intervention has a significant effect on the blood glucose level of overweight middle-aged women Teaching Staff Govt. School Bolpur.

Zumba fitness intervention at low to moderate intensities results in decreased insulin secretion during exercise and a decline in blood glucose and insulin levels. Glucose uptake is stimulated by previously activated muscle fibers when insulin sensitivity has been enhanced by exercise (Gulve, 2008).

The result of hypothesis testing on effects of a zumba fitness intervention on the body mass index of overweight middle-aged women teaching staff Govt. School Bolpur. Using the inferential statistics of paired sample t-test concluded that Eight weeks of Zumba fitness intervention has a significant effect on the body mass index of overweight middle-aged women Teaching Staff Govt. School Bolpur.

The result of hypothesis testing on effects of Eight weeks of a zumba fitness intervention on the resting heart rate of overweight middle-aged women Teaching Staff Govt. School Bolpur. Using the inferential statistics of paired sample t-test concluded that Eight weeks of Zumba fitness intervention has a significant effect on the resting heart rate of overweight middle-aged women Teaching Staff Govt. School Bolpur.

V.   Recommendations

The following recommendations were made from the results of the study and they include;
1. Women teaching staff should embrace Zumba fitness intervention to eliminate the risk of getting excessively high blood glucose levels.
2. Zumba fitness intervention should be introduced to teenage overweight female to promote their fitness level and reduce body fat.
3. Zumba fitness intervention classes should be introduced in various local government and private areas to encourage women's participation in Zumba dance fitness.
4. Women should participate in Zumba dance at least three times a week.
5. The introduction of Zumba dance in the weekly work routine can eliminate the risk of cardiovascular problems by improving the cardiorespiratory system.

References

[1]   Miller, K.R.; Mcclave, S.A.; Jampolis, M.B.; Hurt, R.T.; Krueger, K.; Landes, S.; Collier, B. The Health Benefits Of Exercise And Physical Activity. Curr. Nutr. Rep. 2016, 5, 204–212. [Google Scholar]
[2]   Vendramin, B.; Bergamin, M.; Gobbo, S.; Cugusi, L.; Duregon, F.; Bullo, V.; Zaccaria, M.; Neunhaeuserer, D.; Ermolao, A. Health Benefits Of Zumba Fitness Training: A Systematic Review. Pm&R 2016, 8, 1181–1200. [Google Scholar]
[3]   World Health Organization. Fact About Overweight And Obesity. 2016. Available Online: Https://Www.Who.Int/News-Room/Fact-Sheets/Detail/Obesity-And-Overweight (Accessed On 28 November 2022).
[4]   Lars, Donath, Ralf Roth, Yannick Hohn,Lukas Zahner &Oliver Faude, "The Effects Of Zumba Training On Cardiovascular And Neuromuscular Function In Female College Students." Pages 569-577 Published Online: 10 Dec 2013 https://Doi.Org/10.1080/17461391.2013.866168.
[5]   Abbas, O. A., & Moses, O. M. (2013). Aerobic And Progressive Resistance Exercise Effects On Body Composition Of Primary School Children In Ibadan, Nigeria. British Journal Of Education, Society &Behavioral Science 3 (2): 163-173
[6]   Bidya Roy And Sanjit Mandal, "Effect Of Strong By Zumba On Waist Hip Ratio Of Middle Aged Sedentary Females". International Journal Of Physical Education, Sports And Health 2017; 4(3): 379-381
[7]   Saha, G. C., & Roy, B. The Effects Of Zumba Fitness Program On Changes Of Body Mass Index And Weight. Physical Education And Applied Exercise Sciences, 131.