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## ORIGINAL ARTICLE

**TO EVALUATE THE EFFECTS OF ZUMBA ON AEROBIC FITNESS, BODY COMPOSITION, PSYCHOLOGICAL WELL BEING AND STRESS IN WOMEN BETWEEN THE AGE GROUP OF 30-50 YEARS: AN INTERVENTIONAL STUDY**

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### ABSTRACT

**Background of the study:** Physical inactivity is one of the major public health concerns since it increases an individuals' risk of morbidity and mortality. The aim of this study was to assess the effect of a 12-week Zumba dance intervention on cardio-respiratory fitness and psychological health among women. **Methodology:** This was an experimental study with 30 women aged between 30-50 years, who were not involved in any exercise other than Zumba dance with regime for 12 weeks. Data was analyzed using SPSS software. **Results:** There was a mean spike of 8.35 ml/kg/min in Aerobic fitness with a mean reduction by 1.5 in the fat mass, mean spike by 1.9 in muscle mass, mean reduction in fat percentage by 2.8%, mean reduction by 1.5 kg/ m<sup>2</sup> in the BMI, mean reduction of 3.2 kg in body weight, mean spike by 2.1 in Psychological well being, mean reduction by 10.4 in Stress. All of them were statistically significant with P<0.002. **Conclusion:** Zumba is effective on all the assessed components on cardio-respiratory fitness and psychological health among women.

**Keywords:** Zumba dance; Physical inactivity; Aerobic fitness; Cardio-respiratory fitness

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## INTRODUCTION

Body weight and body mass index often associated with aging process. Usually lean mass and bone mineral density decrease, percent body fat increases with individual's age. More specifically fat mass area at abdominal region increase along with cardiovascular disease and diabetes in aged people.

Health status of women is contributed with perimenopause and the menopause stages related to weight gain with age. Body composition changes are due to alterations in energy balance with a positive energy balance leading to weight gain and a negative balance resulting in weight loss. Menopause transition is associated with changes in body composition has been reported in many studies <sup>1</sup>.

Cardiovascular mortality, stroke, Diabetes, all is risk factors of overweight may lead to mortality in middle aged. Adipose tissue functions of secreting a variety of cytokines including leptin, plasminogen activator inhibitor; these have risks on healthy life, which has been reported in current researches<sup>2</sup>.

Hormonal change in perimenopause can make changes in secretion of estrogen and progesterone levels which disturb sleep pattern, mood swing, and can reduce energy level. Memory loss, anxiety, decreased interest in any activities; emotional changes and weight gain are also related with menopause. Women are affected with their career in midlife crisis associated with hormonal changes in life. Due to decline interest in activities by hormonal changes, women are experiencing difficult to success in life ambitions. Women experiences miserable life due to loss of fertility, physical or emotional abuse, significant change in their

identity, divorce, death of a family, all lead them to persistent sense of grief<sup>3</sup>.

Zumba is an amazing combination of fun and fitness. It has been globally addressed as a Dance fitness party. Zumba has Latin American roots which make this dance form fun due to its upbeat and happy music. Women would prefer Zumba over Gym and other fitness clubs since it's so much fun to dance on various catchy rhythms and at the same time burn those extra calories without even realizing. Zumba is a fitness format inspired by music and dance across the world like SALSA, MERRENCE, TANGO, KUMBIA, RHEGETON, and FLEMENGO. It was originated in COLOMBIA in 1990s by ALBERTO BETO PEREZ.

It is a total body workout, not only giving mental and physical health but also is said to be safe and an effective form of fitness. On an average 500-800 calories are burnt in a single Zumba session. Zumba works on the principle of interval training. According to this principle, the heart rate is targeted to increase and decrease in an alternate way according to the different rhythms mentioned below. A total 8 Zumba songs are covered in a session of 45 minutes in a particular order, following the interval training principle<sup>4</sup>.

Following are the sequences of the zumba songs in a session;

1. Warm up which includes step test with and without arm variations, here the targeted heart rate is low which gradually increases.
2. Warm up, here the targeted heart rate is high. (Cardio)
3. Salsa rhythm, here the targeted heart rate is low.
4. Rhegeton rhythm, here the targeted heart rate is high.

5. Kumbia rhythm, here the targeted heart rate is low.
6. Merenge rhythm, here the targeted heart rate is high.
7. Salsa rhythm, here the targeted heart rate is low.
8. Cool down song which includes upper limb and lower limb stretching exercises.( Stretch is held for 30 seconds in each position.)

## METHODOLOGY

This was an experimental study. The intervention lasted for total 12 weeks. Three Zumba sessions were conducted in a week on alternate days; each session lasted for 45 minutes. The study was conducted at 9th Gear Fitness club, Mulund West, Mumbai, India.

Materials required for the study were; a 16 inch step box (41cm), A body composition analyzer machine, outcome measure scales to evaluate Stress and the Psychological well being Questionnaire.

**Participants:** 30 women were recruited on the basis of inclusion and the exclusion criteria.

**Inclusion Criteria:** Women belonging between the age group of 30-50 years of age who have never practiced Zumba before were included for the study.

**Exclusion Criteria:** Women involved in any other exercise program. Women suffering from neurological, cardiac and musculoskeletal disorders, pregnant women and Disabled women were excluded from the study.

**Intervention:** A convenient sample of 30 subjects was recruited based on the inclusion and the exclusion criteria. 30 women participated in a Zumba intervention for total

12 weeks (3 months) , thrice a week for 45 minutes each. (total 36 sessions )

The group was assessed for four components viz, Aerobic fitness, Body composition (which includes Muscle mass , Fat percentage , Fat mass , Body weight and BMI), Psychological well being and Stress at the start of the intervention and immediately at the end of 12 weeks using a 3 minute Queen's Step Test , Body composition analyzer, Psychological wellbeing questionnaire , Perceived Stress scale respectively. The data collected at the end of 12 weeks was statistically analyzed.

**Outcome measures:** Aerobic Fitness by using a 3minute step test, Psychological well being by using a Ryff's Psychological wellbeing questionnaire (18 items), Body composition using a Body composition Analyzer which includes Fat mass, Muscle mass, Body weight, BMI and body fat percentage. Stress levels using a Perceived Stress Scale (10 questions)

**Data analysis:** Data was analyzed using SPSS software. Data was analyzed for normality using Shapiro wilk test. Data was normally distributed then paired t test was done to compare the data within the same group.

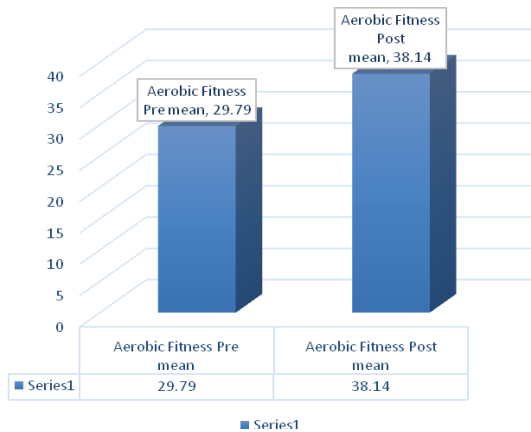
## RESULTS

On assessment of Aerobic Fitness by 3 minute Queen's Step Test after duration of 12 weeks, it was noted that there was a significant difference in the values among the participants. There was a mean spike of 8.35 ml/kg/min, which is statistically significant.

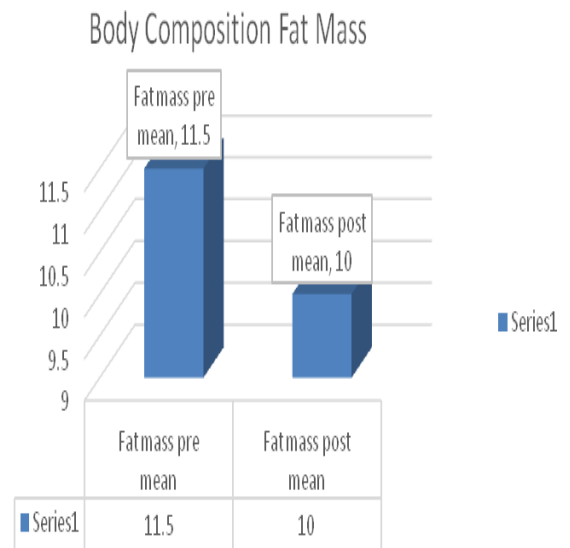
COMPONENTS	PRE MEAN	STANDARD DEVIATION	POST MEAN	STANDARD DEVIATION	P VALUE
Aerobic fitness	29.79	12.62	38.14	9.76	0.000
<b>Body Composition</b>					
Body weight	67.96	7.00	64.23	6.52	0.000
BMI	27.4	3.07	25.97	2.88	0.000
Muscle mass	29.5	7.18	31.4	6.59	0.000
Fat mass	11.50	2.48	10.0	2.76	0.001
Body fat Percentage	35.73	5.09	33.66	5.06	0.000
Psychological Wellbeing Questionnaire	13.83		15.92		0.002

**Table 1:** Pre Mean and Post Mean of Components evaluated

On assessing Fat mass by Body composition analyzer, it was noted that there was a significant difference in the values among the participants. There was a mean reduction by 1.5 which is statistically significant.

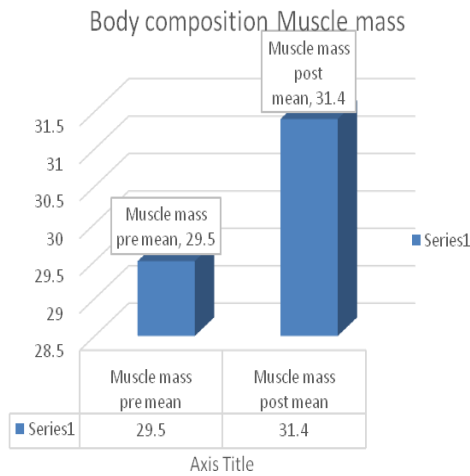


**Figure 1:** Pre and post mean comparison of Aerobic fitness



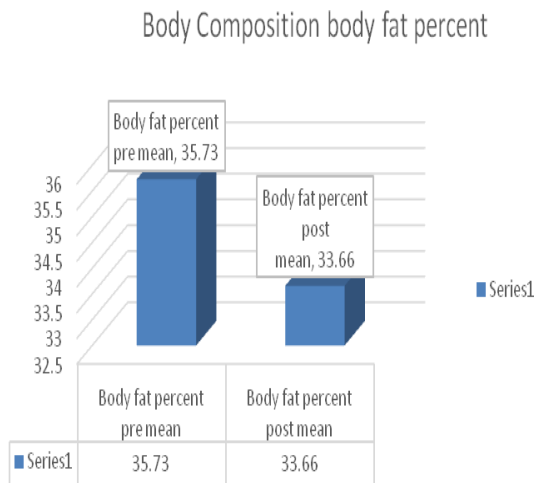
**Figure 2:** Pre and post mean comparison of fat mass in the body composition.

On assessing Muscle mass, it was noted that there was a significant difference in the values among the participants. There was a mean spike by 1.9 which is statistically significant.



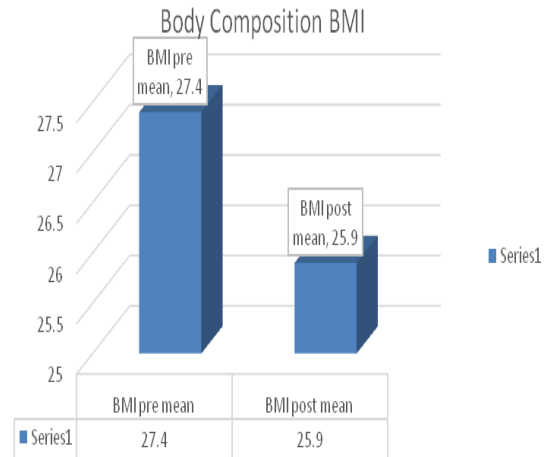
**Figure 3:** Pre and post mean comparison of muscle mass in body composition.

On assessment of the body fat percentage, it was noted that there was a significant difference between the pre and the post mean values. There was a mean reduction by 2.8% which is statistically significant.



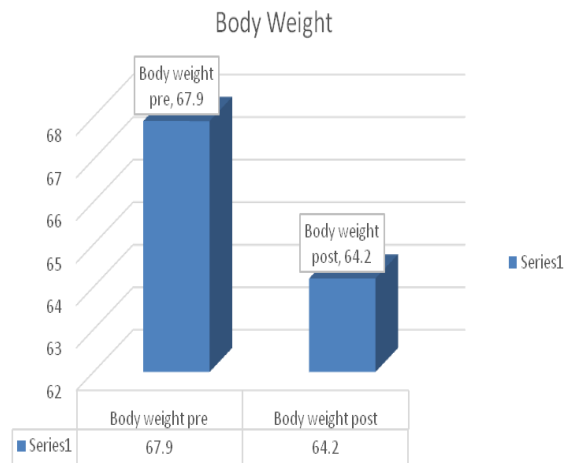
**Figure 4:** Pre and post mean comparison of fat percentage in body composition

On assessment of the BMI, it was noted that there was a significant difference in the pre and post mean values. There was a mean reduction by 1.5 kg/ m<sup>2</sup> in the BMI which is statistically significant.



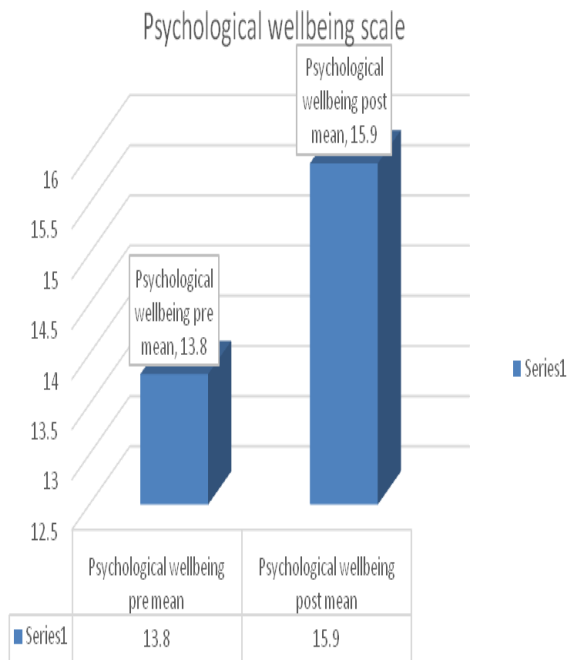
**Figure 5:** Pre and post mean comparison of the BMI in Body composition

On assessment of Body weight significant difference was noted in the weight of the participants. There was a mean reduction by 3.2 kg of body weight which is statistically significant.



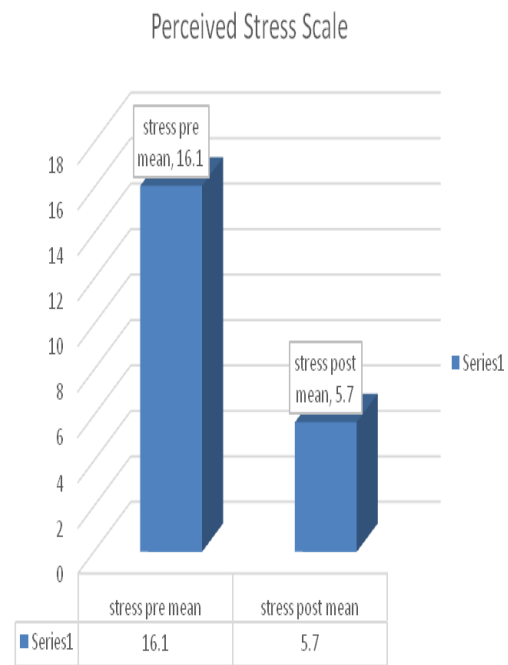
**Figure 6:** Pre and post mean comparison of body weight in the body composition

On assessment of the Psychological wellbeing using a 42 item Psychological wellbeing questionnaire, it was noted that there was significant difference in the psychological wellbeing among participants. There was a mean spike by 2.1 which is statistically significant.



**Figure 7:** Pre and post mean comparison of Psychological well being.

On assessment of the Stress level using Perceived Stress scale, it was noted that there was a significant difference in the stress level among participants. There was a mean reduction by 10.2



**Figure 8:** Pre and post mean of stress

## DISCUSSION

This study aimed at assessing the effects of Zumba on Aerobic fitness, Body composition, Psychological well being and stress among women. Zumba is an intense cardio workout that gets your blood pumping, your muscles working and your armpits sweating.

According to the statistical analysis, Zumba showed significant changes in the pre and post mean values of the components assessed. Viz,

1. Aerobic Fitness,
2. Body composition which has included Body weight, BMI, Muscle mass, Fat mass and Body fat percentage.
3. Psychological wellbeing,
4. Stress.

On assessment of the Aerobic fitness by Queen’s 3 minute step test, it was noted that the post mean value increased by 8.35 ml/kg/min. Aerobic capacity is the capacity of

the heart and lungs to supply oxygen to the muscles during exercise. VO<sub>2</sub>max is the maximum amount of oxygen required during activities. The more cardiovascular conditioned is related with higher the use of VO<sub>2</sub>max, that means the more oxygen able to utilize with each breath. VO<sub>2</sub>max is evaluated as the best measures of cardio respiratory fitness. Each liter of oxygen utilized burns about 5 kcals so the higher the VO<sub>2</sub>max, the more energy you will require to exercise meaning you can burn more calories and get better more intense workouts. Zumba resulted in increase in the aerobic capacity, thus increasing the endurance and increasing the VO<sub>2</sub> max levels.

The Zumba practice has explored effects on losing total body fat mass and increasing VO<sub>2</sub>peak. Many studies have reported the effect of Zumba Exercise on reduction of body weight and enhance of VO<sub>2</sub> Peak. Physiological changes associated with Zumba training have proved effect on age related impact on metabolism and body mass. Studies suggest that combining Zumba exercise with other training modalities like strength training can produce better effect on VO<sub>2</sub> Max and reduce fat mass between males and females<sup>5-7</sup>.

Zumba training has reported effect on improving cardiorespiratory fitness and VO<sub>2</sub>peak with p-value = 0.03. Zumba practice is useful in daily life to improve health status of individual<sup>8-10</sup>. Studies proved Zumba practice significantly improves VO<sub>2</sub>peak in all people. Comparative study between Zumba and spinning, body pump have found more benefits of Zumba over other disciplines in special populations with physical injuries. Furthermore, this intervention is a facilitator of dance intervention that motivates aerobic

physical activities, which have a positive effect on cardiovascular fitness<sup>10,11</sup>.

Zumba is a latin themed aerobic dance, with in self determination theory. The concept of the program was providing happiness and subjective vitality by means of physical activity. The principle theory of this specific dance was to motivate people to achieve specific outcome of healthy physique and mental happiness with engaged activities which are interested to perform as a group<sup>12-14</sup>.

Zumba is aerobic exercises which perform with a musical rhythm. Many studies have reported the effect of Zumba dance, specifically for females on regulate VO<sub>2</sub> max level and body overweight. This dance has a different strategy program according to the fitness of the individuals. The duration and strategy of the program can set with the health status of the people and depends on the expected outcome of different group of participants. The program starts with simple body movements and later trained for complex body movements in advanced stages of the program. Meta analysis report on this program has stated as females are more involved in this type of activities to improve their physical fitness<sup>15</sup>.

Physical activities by Zumba practice helps to highlight the potential benefits of health and fitness status in different populations. It is important to find the comparative effect of this program with other physical exercise as well as in combination other program. Future studies are recommended to evaluate the effect of this Zumba dance over other aerobic exercises. Different outcomes of this practice are essential to find out other than the effect on fitness, overweight and VO<sub>2</sub> max, for

recommending to people with mental and physical ailments <sup>16</sup>.

On assessment of the Body composition using the Tanita Body composition analyzer , which included assessing Body weight , BMI, Muscle mass, Fat mass and body fat percentage , it was noted that there was a significant difference noted in the post mean values in each domain. In case of Body weight , the post mean decreased by 3.7kg ,in BMI the post mean decreased by 1.5kg/m<sup>2</sup>, in muscle mass the post mean increased by 1.9, in fat mass the post mean decreased by 1.5 and in the body fat percentage , the post mean decreased by 2.8% <sup>17</sup>.

Zumba is an aerobic activity which targets high and low heart rate and involves repetitive movements like jumping, squats, lunges with different arm and leg variations; it resulted in improvement in the body composition. The study results clearly indicated that the zumba fitness exercise can be used as effective group fitness exercise for the change in body composition of women. The uniqueness of Zumba fitness exercising is in the variety of Latin dance choreographies and dynamic music that create an atmosphere of fun (zumba party) in which participants forget they are practicing. This approach to exercise enables long -lasting interest and continuous exercising <sup>18,19</sup>.

On assessment of the Psychological wellbeing using a Psychological wellbeing scale questionnaire it was noted that there was an increase in the post mean value by 2.1 and stress post mean decreased by 10.4 It leads to gush of endorphin which results in inner joy and makes one feel good from within thus decreasing the stress level and improves overall wellbeing of the participants.

## CONCLUSION

This study concluded that Zumba was effective in increasing the aerobic capacity , muscle mass of the body and decrease the body weight , BMI , body fat percentage , stress level and it improved the overall wellbeing of the participants which is statistically significant.

**Limitations:** Small sample size and did not assess pre and post intervention water retention which is a part of body composition evaluation.

### Ethical Approval:

Ethical approval was given by the Maharashtra University of Health Sciences, Nashik, India before the start of interventional study. Following norms were followed

1. This Research will not harm the participants involved in the trial.
2. An Informed consent shall be obtained from the participants before starting the trial ensuring, they understand that they are taking part in research and know what is required of them.
3. Research data collected will be anonymous at all stages of the process from collection to publication. If we intend to provide identity of participants in the study, permission will be obtained first.
4. Research participants will have right to withdraw from the process at any point and will be made aware of it from the start.

**Conflicts of Interest:** None.

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