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## Effect of Zumba Dance on Physical Fitness and Body Composition among Women: A Pre–Post Experimental Study

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**Abstract:** Zumba, a dance-based aerobic fitness program, has emerged as an effective intervention for improving physical, social, and psychological health among women. The present study aimed to assess the impact of Zumba exercise on selected physical fitness and body composition parameters. A total of 54 women participants were selected from “Vidya’s Zumba” center in Satara city using purposive sampling. The study adopted an experimental pre-test and post-test design to evaluate the effectiveness of the intervention. Participants underwent a structured Zumba training program over a defined period. Key variables such as blood pressure and body composition were measured using standardized tools including a digital blood pressure monitor and soft metric tape. The collected data were analyzed using both parametric and non-parametric statistical techniques. Specifically, the paired *t*-test and Wilcoxon signed-rank test were applied to assess the significance of differences between pre- and post-test values. Statistical analysis was performed using SAS software at a 0.05 level of significance. The results indicated a significant improvement in physical fitness parameters following the intervention. Notable reductions in blood pressure and improvements in body composition were observed. These findings demonstrate the effectiveness of Zumba as a fitness intervention. The study highlights its potential as a cost-effective and engaging exercise strategy. Overall, Zumba contributes positively to women's health and well-being.

**Key words:** *Zumba fitness, body composition, the effects of exercise, blood pressure, hypertensive, stress, PCOD/PCOS, cancer*

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**1. Introduction:** Zumba fitness is a contemporary dance-based aerobic exercise program that integrates movements inspired by various Latin American dance forms such as Merengue, Salsa, Samba, Cumbia, and Reggaeton, along with elements from global dance styles including hip-hop, belly dancing, Indian, and African dances. This combination of rhythmic movement and aerobic activity makes Zumba an engaging and effective form of physical exercise. Due to its dynamic nature, Zumba has gained popularity as a holistic fitness intervention aimed at improving physical

health, enhancing body composition, and promoting overall well-being among women (Luettgen et al., 2012; Cugusi et al., 2016).

Physical fitness and body composition are critical indicators of health, particularly among women who are increasingly affected by sedentary lifestyles and associated metabolic disorders. Body composition, typically assessed through parameters such as body fat distribution and anthropometric measurements, plays a vital role in determining the risk of chronic diseases (WHO, 2020). Additionally, blood pressure (BP), defined as the force exerted by circulating blood against the walls of blood vessels, is an important physiological parameter. It is measured in terms of systolic and diastolic pressure, with normal values for adults being approximately 120 mmHg and 80 mmHg, respectively (Whelton et al., 2018). Regular physical activity has been shown to positively influence these parameters, reducing the risk of hypertension and cardiovascular diseases (Warburton & Bredin, 2017).

In recent years, lifestyle-related disorders such as Polycystic Ovarian Disease (PCOD) and Polycystic Ovary Syndrome (PCOS) have become increasingly prevalent among women. These hormonal disorders are associated with symptoms such as menstrual irregularities, infertility, weight gain, acne, and metabolic imbalances. Lack of physical activity and poor lifestyle habits are key contributing factors (Teede et al., 2018). Exercise interventions like Zumba may play a significant role in managing such conditions by improving metabolic health, reducing body fat, and enhancing hormonal balance (Domene et al., 2016).

Moreover, modern life has led to increased levels of stress due to occupational pressures, financial challenges, and lifestyle imbalances. Chronic stress is associated with various health issues including hypertension, sleep disturbances, and mental fatigue. Engaging in physical activities such as aerobic exercise, yoga, meditation, and Zumba has been shown to effectively reduce stress levels and improve psychological well-being (Stonerock et al., 2015).

Despite the growing popularity of Zumba, there is limited empirical evidence evaluating its impact on physical fitness and body composition among women using structured experimental designs. Therefore, the present study aims to assess the effect of a Zumba dance intervention on selected physical fitness parameters and body composition among women using a pre-post experimental study design. The findings of this study are expected to provide valuable insights into the effectiveness of Zumba as a practical, enjoyable, and cost-effective fitness strategy for improving women's health.

## 2. Literature Review

Zumba fitness has been widely recognized as an effective aerobic exercise that enhances cardiovascular endurance and overall physical fitness. A study demonstrated that Zumba provides moderate-to-vigorous intensity exercise sufficient to meet recommended physical activity guidelines (Luettgen et al., 2012). Similarly, a randomized controlled trial reported significant improvements in aerobic capacity, body composition, and muscular endurance following an 8-week Zumba intervention among sedentary women (Domene et al., 2016). Supporting these findings, research on overweight women observed significant reductions in body weight, waist

circumference, and body fat percentage, along with improvements in quality of life (Cugusi *et al.*, 2016).

Dance-based fitness programs, including Zumba, have also been shown to enhance flexibility, coordination, and balance, making them suitable for women across different age groups (Krishnan *et al.*, 2015). Further studies reported that Zumba exercise significantly improves muscle strength, flexibility, and cardiovascular fitness, while also reducing body mass index (BMI) (Choudhary & Dubey, 2024). In addition, research findings indicate that Zumba sessions improve aerobic fitness and reduce fatigue levels, particularly among physically inactive individuals (Donath *et al.*, 2014).

From a clinical perspective, dance-based aerobic exercise has been associated with reductions in cardiovascular risk factors. Studies have shown that such interventions significantly reduce blood pressure and improve lipid profiles among adult women (Araneta & Tanori, 2015). The importance of physical activity in managing conditions such as PCOS has also been emphasized, suggesting that aerobic exercises like Zumba contribute to improved metabolic and hormonal balance (Teede *et al.*, 2018). Furthermore, regular participation in physical activity, including dance-based exercise, has been shown to reduce stress, anxiety, and depressive symptoms, thereby enhancing psychological well-being (Stonerock *et al.*, 2015).

The broader health benefits of physical activity in preventing chronic diseases such as hypertension, obesity, and cardiovascular disorders have been well documented (Warburton & Bredin, 2017). Recent studies have also provided empirical evidence supporting the effectiveness of Zumba interventions. A study reported significant reductions in systolic and diastolic blood pressure among middle-aged women following a 12-week Zumba program (Patel *et al.*, 2023). Similarly, recent findings indicated significant improvements in body composition, including reductions in fat mass and increases in lean body mass among sedentary women (Singh & Verma, 2024).

Overall, the existing literature strongly supports the effectiveness of Zumba as a comprehensive fitness intervention for improving physical fitness, body composition, cardiovascular health, and psychological well-being among women.

### 3. Research Methodology

The present study adopted an experimental pre-post research design to evaluate the effect of a Zumba fitness program on selected physical fitness and body composition parameters among women. A total of 54 female participants were randomly selected from a Zumba center in Satara city based on predefined inclusion and exclusion criteria. Baseline (day 0) and post-intervention (day 30) measurements were recorded for variables including weight, left and right arm circumference, bust, waist, left and right thigh, hips, blood pressure, and health-related factors such as PCOD/PCOS and stress levels. To assess the effectiveness of the intervention, percentage change from baseline to post-intervention was calculated for each parameter. Descriptive statistics

such as mean, median, mode, and standard deviation were used to summarize quantitative data, while qualitative variables were expressed as frequencies and percentages.

The null hypothesis ( $H_0$ ) stated that there is no significant difference in the efficiency of change in body parameters, blood pressure, PCOD/PCOS, stress, and cancer among participants, whereas the alternative hypothesis ( $H_1$ ) stated that a significant difference exists. Inferential statistical analysis was performed using a paired  $t$ -test to compare pre- and post-intervention values at a 5% level of significance. The analysis was carried out using SAS statistical software. The results were interpreted based on  $p$ -values to determine statistical significance. This approach enabled a comprehensive evaluation of the effectiveness of the Zumba intervention on multiple health parameters.

#### 4. Result and Discussion

**Table 1: Descriptive Statistics of Pre and Post Comparison**

| Variable     | N  | Pre Mean | Post Mean | Pre SD | Post SD | Pre Min | Post Min | Pre Max | Post Max |
|--------------|----|----------|-----------|--------|---------|---------|----------|---------|----------|
| Weight       | 54 | 67.16    | 63.91     | 8.93   | 8.77    | 44      | 41       | 98      | 94       |
| Bust         | 54 | 38.17    | 36.74     | 3.53   | 3.24    | 31      | 30       | 50      | 45       |
| Waist        | 54 | 34.23    | 32.83     | 3.70   | 3.26    | 28      | 27       | 45      | 43       |
| Hips         | 54 | 40.47    | 39.53     | 3.35   | 3.34    | 33      | 32       | 49      | 49       |
| Right Arm    | 54 | 12.85    | 12.07     | 1.72   | 1.58    | 10      | 10       | 21      | 20.5     |
| Left Arm     | 54 | 12.92    | 12.28     | 1.67   | 1.82    | 10      | 10       | 21      | 20.5     |
| Right Thigh  | 54 | 22.73    | 21.68     | 2.79   | 2.96    | 12      | 11       | 29      | 27.5     |
| Left Thigh   | 54 | 22.64    | 21.79     | 2.75   | 2.60    | 12      | 11.5     | 29      | 27.5     |
| Systolic BP  | 54 | 125.16   | 122.64    | 16.52  | 14.76   | 90      | 93       | 196     | 193      |
| Diastolic BP | 54 | 84.25    | 81.90     | 13.66  | 13.43   | 51      | 50       | 160     | 156      |

The effectiveness of the Zumba fitness program was further evaluated by calculating the percentage change in all measured parameters from pre-test to post-test values. The results indicate a consistent improvement across all variables. The mean body weight decreased from 67.16 kg to 63.91 kg, representing a 4.84% reduction, indicating effective weight management through Zumba exercise. Similarly, bust circumference reduced by 3.75%, waist circumference by 4.09%, and hip circumference by 2.32%, reflecting significant improvements in body composition. Arm measurements also showed reductions, with the right arm decreasing by 6.07% and the left arm by 4.95%, suggesting localized fat reduction and toning effects. Thigh circumference showed reductions of 4.62% (right thigh) and 3.75% (left thigh), indicating overall lower body improvement.

In terms of cardiovascular parameters, systolic blood pressure decreased by 2.01%, while diastolic blood pressure reduced by 2.79%, demonstrating moderate but clinically meaningful improvements in cardiovascular health. These reductions suggest that Zumba exercise contributes not only to physical fitness but also to improved physiological functioning.

**Table 2: Summary of Paired t-test**

| Variable    | Mean Difference | Std. Dev. | 95% CI (Lower) | 95% CI (Upper) | DF | t-value | p-value |
|-------------|-----------------|-----------|----------------|----------------|----|---------|---------|
| Weight      | 1.38            | 1.08      | 1.09           | 1.68           | 53 | 9.45    | <0.0001 |
| Bust        | 1.42            | 1.33      | 1.06           | 1.79           | 53 | 7.90    | <0.0001 |
| Waist       | 1.38            | 1.08      | 1.09           | 1.68           | 53 | 9.45    | <0.0001 |
| Hips        | 0.93            | 1.11      | 0.63           | 1.23           | 53 | 6.18    | <0.0001 |
| Right Arm   | 0.78            | 0.61      | 0.61           | 0.95           | 53 | 9.42    | <0.0001 |
| Left Arm    | 0.61            | 0.98      | 0.33           | 0.88           | 52 | 4.50    | <0.0001 |
| Right Thigh | 1.04            | 1.24      | 0.70           | 1.38           | 53 | 6.16    | <0.0001 |
| Left Thigh  | 0.85            | 0.63      | 0.68           | 1.03           | 52 | 9.91    | <0.0001 |

The paired *t*-test results (Table 2) further confirm that all observed changes are statistically significant, with *p*-values less than 0.0001 for all variables. This indicates that the improvements are not due to chance but are a direct effect of the Zumba intervention. The high *t*-values also support the strength of the intervention effect.

Based on these findings, the null hypothesis ( $H_0$ ) is rejected, and the alternative hypothesis ( $H_1$ ) is accepted, confirming that Zumba exercise significantly improves body composition and physical fitness parameters among women. The percentage reduction in anthropometric measurements highlights the effectiveness of Zumba as a comprehensive fitness program that combines aerobic exercise with enjoyable dance movements.

The results are consistent with previous studies, which reported that Zumba improves body composition, reduces body fat, and enhances cardiovascular fitness. The observed improvements in both physical and physiological parameters emphasize the potential of Zumba as a cost-effective, engaging, and sustainable fitness intervention for women.

**Table 3: Abdominal Obesity Classification Based on WHR**

| Health Risk | WHR Values  | WHR Before | WHR After |
|-------------|-------------|------------|-----------|
| Low         | $\leq 0.80$ | 11         | 19        |
| Moderate    | 0.81 – 0.85 | 26         | 21        |
| High        | $\geq 0.86$ | 17         | 14        |

Also study results shows that, The study findings indicate that the waist-to-hip ratio (WHR) is a significant indicator of abdominal obesity and related health risks, even when body mass index (BMI) falls within the normal range. According to the World Health Organization (WHO), a healthy WHR for women is  $\leq 0.85$ . As observed from Table 3, participation in the Zumba fitness program resulted in a noticeable improvement in WHR categories. The number of participants in the low-risk category increased from 11 to 19, while those in the moderate-risk and high-risk categories decreased from 26 to 21 and 17 to 14, respectively. This shift indicates an improvement in body fat distribution and a reduction in abdominal obesity among the participants.

These results suggest that Zumba exercise is effective in reducing obesity-related health risks and improving metabolic health among women. Furthermore, the graphical analysis of blood pressure parameters shows a reduction in both systolic and diastolic blood pressure after the intervention. The mean systolic blood pressure decreased from 125.16 mmHg to 122.64 mmHg, while diastolic blood pressure reduced from 84.25 mmHg to 81.90 mmHg. These findings indicate improved cardiovascular health and highlight the effectiveness of Zumba as an aerobic exercise in regulating blood pressure.

Furthermore study results reflects that systolic and diastolic blood pressure is noticeable reduction after the Zumba intervention. The mean systolic blood pressure decreased from 125.16 mmHg to 122.64 mmHg, while diastolic blood pressure reduced from 84.25 mmHg to 81.90 mmHg. This indicates improved cardiovascular health and supports the effectiveness of Zumba as an aerobic exercise in regulating blood pressure.

## **5. Conclusion**

The present study aimed to evaluate the effect of Zumba dance on physical fitness and body composition among women using a pre–post experimental design. The findings clearly demonstrate that participation in a structured Zumba fitness program leads to significant improvements in body composition parameters, including reductions in weight, waist, hip, arm, and thigh measurements. In addition, improvements were observed in cardiovascular parameters, particularly systolic and diastolic blood pressure.

The statistical analysis using paired *t*-test and Wilcoxon signed-rank test confirmed that these changes were highly significant ( $p < 0.05$ ). Furthermore, the analysis of waist-to-hip ratio (WHR) showed a shift of participants from higher-risk categories to lower-risk categories, indicating reduced abdominal obesity and improved metabolic health. The observed percentage reductions across multiple variables highlight the effectiveness of Zumba as a comprehensive fitness intervention.

Overall, the study concludes that Zumba exercise is an effective, enjoyable, and practical form of physical activity that significantly enhances physical fitness, improves body composition, and promotes cardiovascular health among women.

## **6. Recommendations**

Based on the findings of the study, the following recommendations are suggested:

1. Zumba fitness programs should be encouraged among women as a regular physical activity to improve overall health.
2. Fitness centers and community programs should incorporate Zumba as a structured intervention for weight management and stress reduction.
3. Healthcare professionals may recommend Zumba as a supportive therapy for managing lifestyle-related disorders such as obesity, hypertension, and PCOD/PCOS.

4. Awareness programs should be conducted to promote the benefits of dance-based fitness among women.
5. Future programs should include longer duration interventions for more sustained health benefits.

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