Study on the Impact of Circuit Training and Zumba Training on the Lung Capacity of Students

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Abstract: The objective of this research study was to investigate the impact of circuit training and Zumba training on the lung capacity of students. The study was conducted with students from Shri H.D. Gardi Uttar Buniyadi Vidyalaya, Vagadhra, aged 12 to 17 years. A total of 90 students participated, divided into three groups: Circuit Training Group (30), Zumba Training Group (30), and a Control Group (30).

Lung capacity was measured using a lung capacity test before and after the training period. Statistical analysis was performed using One-Way Analysis of Covariance (ANCOVA) and the Least Significant Difference (LSD) test, with a significance level of 0.05.

The results showed that students in both the circuit training and Zumba training groups exhibited significant improvement in lung capacity compared to the control group. Over the 12-week training program, both interventions were found to enhance lung capacity significantly.

Key Words: Circuit Training, Zumba Training, Lung Capacity

Introduction

The human body is akin to a sophisticated machine. The science that provides knowledge about the structure of the body is called physiology. This discipline gives insights into the size, shape, location, relationships with other organs, structure, and chemical processes of various organs. Understanding the structure of an organ is essential to gaining knowledge about its functions. This branch of anatomy is referred to as physiology. By studying physiology, we gain an understanding of the organs, their functions, and their impact on the entire body.

Every part of the body has a specific function to perform. These specialized parts are known as organs. The body includes systems such as the circulatory system, respiratory system, digestive system, excretory system, skeletal system, muscular system, nervous system, endocrine glands, and reproductive system.

The circuit training method is a form of body conditioning that includes various types of endurance training, resistance training, high-intensity aerobics, and exercises performed in circuits at either high or low intensity. This training method focuses on building strength and improving muscular endurance. A "circuit" is a circular sequence of all the exercises in a program. Once a circuit is completed, the individual begins the next circuit with the first exercise. Traditionally, in circuit training, the time between exercises is kept short.

Objective of the Study

The objective of this research study was to examine the effects of circuit training and Zumba training on the lung capacity of students.

Selection of Subjects

In this research study, students from Shri H.D. Gardi Uttar Buniyadi Vidyalaya, Vangadhra, were selected as subjects. The study was limited to male students aged 12 to 17 years. A total of 90 subjects were selected for this research, divided into three groups: 30 in the Circuit Training Group, 30 in the Zumba Training Group, and 30 in the Control Group.

Measurement Standards

No.	Variable	Test	Measurement
1	Lung Capacity	Breath-holding ability	Time

Statistical Process

To determine the effects of circuit training and Zumba training on lung capacity, a One-Way Analysis of Covariance (ANCOVA) test was applied. Differences in mean values were analyzed using the Least Significant Difference (LSD) test at a 0.05 level of significance.

The results of the study.

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Table – 1

Pulmonary capacity test: Comparison and differentiation of two experimental groups and one control group.
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Test	Group			Analysis of variance and covariance segregation.				
	Cyclic Training	Zumba Training	Controlled		Sum of Squares (SS)	Degrees of Freedom (df)	Mean Square Variance (MSS)	F
Pre-Test Mean	21.300	21.533	21.633	A	16.05	2	8.02	0.165
				W	244.70	87	2.81	
Post-Test Mean	25.533	25.800	21.900	A	22.56	2	11.28	40.362*
				W	1.13	87	3.59	
Adjusted Mean	25.567	25.792	21.874	A	16.29	2	8.14	42.631*
				W	79.49	86	0.92	

The standard of significance at the 0.05 level for 'F' = 0.05 (2, 87) = 3.101 & (2, 86) = 3.103.

The above table (Table 1) shows the statistical data for the pre-test and post-test means and standard deviations for the 'F' ratio. According to this, the pre-test means for the groups (Circuit training group = 21.300, Zumba training group = 21.533, Control group = 21.633) resulted in an 'F' ratio of 0.165. When compared with the table value (3.101) at the 0.05 level, it was found not to be significant. Therefore, the division of participants between the experimental and control groups was successful.

The post-test means for the three groups (Circuit training group = 25.533, Zumba training group = 25.800, Control group = 21.900) resulted in an 'F' ratio of 40.362. When compared with the table value (3.101) at the 0.05 level, it was found to be significant. This shows that the training provided led to a significant improvement in the appearance of the subjects. Additionally, the adjusted means (Circuit training group = 25.567, Zumba training group = 25.792, Control group = 21.874) resulted in an 'F' ratio of 42.631. When compared with the table value (3.103) at the 0.05 level, it was found to be significant. The difference between the three groups based on the adjusted means is significant.

To assess the significance of the differences between the adjusted post-test means and determine which group (Circuit training or Zumba training) had a more effective impact, the significance of the difference between the adjusted means was tested, as shown in Table 2.

Table – 1

Table Showing the Revolutionary Difference Between the Means of Two Experimental and One Control Group for the Pulmonary Strength Test Appearance

Mean			Mean Difference	Dramatic Difference
Cyclic Training	Zumba Training	Controlled		
25.567	25.792		0.82*	
25.567		21.874	0.97*	0.49
	25.792	21.874	0.16	

At the 0.05 significance level:

In the above Table 2, the difference between the adjusted means of two experimental groups and one control group for the pulmonary strength test appearance can be clearly seen. The information on the mean differences presented in the table shows the differences between the Circuit Training group – Zumba Training group, Circuit Training group – Control group, and Zumba Training group – Control group. By comparing these differences with the revolutionary differences, it becomes easier to understand how much improvement occurred in each group (in order) due to the provided training.

According to Table 6, a very significant improvement (3.918) was observed in the Zumba Training group. Following that, the Circuit Training group showed an improvement at the level of (3.693). Between the two experimental groups, Zumba Training showed a more significant effect of the training compared to the Circuit Training group. Compared to the control group, both experimental groups, Circuit Training and Zumba Training, showed a significant effect of the training. However, no significant difference in the effect of training was found between the two experimental groups. Nevertheless, both experimental groups showed a significant effect when compared to the control group.

Summary:

It is clear that due to Circuit Training and Zumba Training, a significant improvement in the pulmonary strength appearance of the subjects was observed in both the Circuit Training group and the Zumba Training group, compared to the Control group. After the 12-week Circuit Training and Zumba Training programs, there was a notable improvement in the pulmonary strength of the selected subjects.

References:

1. Pradyuman R. Bhatt, **Physiology: Health Science and Sports Science**, (Ahmedabad: Dhaval Publication, Lakshmiganagar Society, 1999)
2. Brian McKenzie, **BrianMac.co.uk**
3. Verma, Prakash J., **A Textbook on Sports Statistics**, Gwalior-Delhi: Sports Publication, 2019.