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# ISOLATED AND COMBINED EFFECT OF AEROBIC EXERCISE AND MEDICINE BALL TRAINING ON CARDIOVASCULAR ENDURANCE AMONG SCHOOL BOYS

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**Abstract**

The purpose of the present study was find out the isolated and combined effect of aerobic exercise and medicine ball training on cardiovascular endurance among school boys. To achieve the purpose of the study was to find out isolated and combined effect of aerobic exercise and medicine ball training on cardiovascular endurance and blood pressure among school boys. The 60 male school boys are selected from Chennai district only. Their age is ranged between 10 to 14 years. They were divided into four group, group one acted as isolated aerobic exercise(IAE) group, group two acted as isolated medicine ball training(IMT) group, group three acted as combined aerobic exercise and medicine ball training(CAMT) group and group IV acted as control group(CG). The following variable namely on cardiovascular endurance were selected for the study. They were tested with 9 min run / walk test respectively. The training period was six weeks. The analysis of covariance (ANCOVA) and Scheffe's Post hoc test was used to assess the collected data. From the analysis of cardiovascular endurance was significantly improved by experimental groups namely the isolated and combined aerobic exercise and medicine ball training among the school boys. The combined aerobic exercise and medicine ball training was found better in improving cardiovascular endurance than the isolated aerobic exercise and medicine ball training among the school boys.

**Key words:** Aerobic Exercise, Medicine Ball Training, Cardiovascular Endurance and School Boys

## INTRODUCTION

The term aerobic means with oxygen or living and working with oxygen aerobic is a system of exercises designed to promote the supply and use of oxygen in the body some of these exercise are running, dancing, rowing, skating and walking aerobic exercise increases cardio- respiratory fitness which is the heart's ability to pump blood and deliver oxygen throughout the body the word aerobic is relatively new in the context of sports and exercise (*Sharon 2007*).The word aerobic meaning with oxygen to represent idea. Even so the dynamics of the idea are more complicated than implied by the definition. Aerobic can be viewed as an intricate system of bodily supply and demand. That is the body need energy for

any kind of activity and the need is filled by burning off the foods that eat. Medicine ball is also known as an exercise ball, or med ball, or a fitness ball. It is a weighted ball roughly the diameter of the shoulder (approx. 13.7 inches). Often used for rehabilitation and strength training, it serves an important role in the field of sports medicine. It should not be confused with the larger, inflated exercise ball (Matt Lawrence, 2003).A medicine ball is a weighted ball, weighing between 1 and 10 kg. Medicine ball can vary size which is made of brown leather, these days they are graded in different colors according to size and one made out soft plastic. The main principle with medicine ball training is the in order to throw catch it, one has to tense many abdominal muscles this creates a solid or stable base to work from. In much the same way as the foundations are laid when building a house, the stronger the foundations the greater the forces that can be applied. The health related physical fitness is the ability to perform moderate to vigorous levels of physical activity without undue fatigue and the capability of maintaining such ability throughout life (Swain & Leotholtz, 2007).The ability of the lungs, heart rate and blood vessels to deliver adequate amounts of oxygen to the cells to meet the demands of prolonged physical activity (Wener & Sharon, 2009).

It may be defined as a series or repetitions of an activity without unduly taking the physiological system that furnishes the fuel and oxygen to the muscle (Shaves Larry, 1981).

**STATEMENT OF THE PROBLEM**

The Purpose of the study was the find out isolated and combined effect of **AEROBIC TRAINING SCHEDULE** aerobic exercise and medicine ball training on cardiovascular endurance among school boys.

**HYPOTHESES**

1. It was hypothesized that there would be significant improvement on cardiovascular endurance among school boys due to isolated and combined aerobic exercise and medicine ball training.
2. It was hypothesized that there would be better significant improvement on cardiovascular endurance among school boys due to combined aerobic exercise and medicine ball training than the isolated aerobic exercise and medicine ball training.

**METHODOLOGY**

The purpose of the study was to find out isolated and combined effect of aerobic exercise and medicine ball training on cardiovascular endurance and blood pressure among school boys. The 60 male school boys are selected from Chennai district only. Their age is ranged between 10 to 14 years. They were divided into four group, group one acted as isolated aerobic exercise(IAE) group, group two acted as isolated medicine ball training(IMT) group, group three acted as combined aerobic exercise and medicine ball training(CAMT) group and group IV acted as control group(CG). The following variable namely on cardiovascular endurance were selected for the study. They were tested with 9 min run / walk test respectively. The training period was six weeks. The analysis of covariance (ANCOVA) and Scheffe's Post hoc test were used in this study.

**Table - I**
**FIRST SECOND AND THIRD WEEK**

| Days | Exercise | No. of. counts | Sets-Reps | Intensity |
|---|---|---|---|---|
| Monday | Marching on the spot | 32 | 4 - 5 | 55% |
| | Ham curl | 32 | 4 – 5 | |
| | Touch Out | 32 | 4 – 5 | |
| | Side to Side | 32 | 4 – 5 | |
| Tuesday | Double side to side | 32 | 4 – 5 | |
| | Grapevine | 32 | 4 - 5 | |
| | Cross over step | 32 | 4 – 5 | |
| | Jump on the spot | 32 | 4 – 5 | |
| Thursday | Knee curl | 32 | 4 – 5 | |
| | Front kick | 32 | 4 – 5 | |
| | Knee and arm lift | 32 | 4 - 5 | |
| | Side kick | 32 | 4 – 5 | |
| Friday | A – step | 32 | 4 – 5 | |
| | V – step | 32 | 4 – 5 | |
| | Ham curl | 32 | 4 – 5 | |
| | Side to Side | 32 | 4 - 5 | |

**Table - II**
**FOUR FIVE AND SIX WEEK**

| Days | Exercise | No. of. counts | Sets-Reps | Intensity |
|---|---|---|---|---|
| Monday | Knee curl | 32 | 6 - 7 | 70% |
| | Front kick | 32 | 6 - 7 | |
| | Knee and arm lift | 32 | 6 - 7 | |
| | Side kick | 32 | 6 – 7 | |
| Tuesday | A – step | 32 | 6 - 7 | |
| | V – step | 32 | 6 - 7 | |
| | Ham curl | 32 | 6 - 7 | |
| | Side to Side | 32 | 6 - 7 | |
| Thursday | Marching on the spot | 32 | 6 – 7 | |
| | Ham curl | 32 | 6 - 7 | |
| | Touch Out | 32 | 6 - 7 | |
| | Side to Side | 32 | 6 - 7 | |
| Friday | Double side to side | 32 | 6 – 7 | |
| | Grapevine | 32 | 6 - 7 | |
| | Cross over step | 32 | 6 - 7 | |
| | Jump on the spot | 32 | 6 - 7 | |

**MEDICINE BALL TRAINING SCHEDULE**

**Table - III**

**FIRST SECOND AND THIRD WEEK**

| Days | Exercises | Weight | Set/Rep | Rest/Se | Weight | Intensit |
|---|---|---|---|---|---|---|
| Monday | Two arm wall pass | 1kg | 2 / 6 | 30 sec | 1.5kg | 55% |
| | Two arm wall pass | 1kg | 2 / 6 | 30 sec | 1.5kg | |
| | Standing triceps extension | 1kg | 2 / 6 | 30 sec | 1.5kg | |
| | Russian Twist | 1kg | 2 / 6 | 30 sec | 1.5kg | |
| | Back throws | 1kg | 2 / 6 | 30 sec | 1.5kg | |
| Tuesday | Single arm press | 1kg | 2 / 6 | 30 sec | 1.5kg | |
| | Front raise | 1kg | 2 / 6 | 30 sec | 1.5kg | |
| | Front squats | 1kg | 2 / 6 | 30 sec | 1.5kg | |
| | Single leg V-ups | 1kg | 2 / 6 | 30 sec | 1.5kg | |
| | Push-ups | 1kg | 2 / 6 | 30 sec | 1.5kg | |
| Thursday | Slams | 1kg | 2 / 6 | 30 sec | 1.5kg | |
| | Crunches | 1kg | 2 / 6 | 30 sec | 1.5kg | |
| | Hammer throw | 1kg | 2 / 6 | 30 sec | 1.5kg | |
| | Lunches | 1kg | 2/6 | 30 sec | 1.5kg | |
| | Squat toss | 1kg | 2/6 | 30 sec | 1.5kg | |
| Friday | Lunge pass | 1kg | 2/6 | 30 sec | 1.5kg | |
| | Chest pass | 1kg | 2/6 | 30 sec | 1.5kg | |
| | Overhead throw | 1kg | 2/6 | 30 sec | 1.5kg | |
| | Single arm toss | 1kg | 2/6 | 30 sec | 1.5kg | |
| | Slams | 1kg | 2/6 | 30 sec | 1.5kg | |

**Table - IV**

**FOUR FIVE AND SIX WEEK**

| Days | Exercises | Weight | Set/Reps | Rest/Set | Weight | Intensity |
|---|---|---|---|---|---|---|
| Monday | Slams | 2kg | 2 / 10 | 40 sec | 2kg | 70% |
| | Crunches | 2kg | 2 / 10 | 40 sec | 2kg | |
| | Hammer throw | 2kg | 2 / 10 | 40 sec | 2kg | |
| | Lunches | 2kg | 2 / 10 | 40 sec | 2kg | |
| | Squat toss | 2kg | 2 / 10 | 40 sec | 2kg | |
| Tuesday | Two arm wall pass | 2kg | 2 / 10 | 40 sec | 2kg | |
| | Two arm wall pass | 2kg | 2 / 10 | 40 sec | 2kg | |
| | Standing triceps | 2kg | 2 / 10 | 40 sec | 2kg | |
| | Russian Twist | 2kg | 2 / 10 | 40 sec | 2kg | |
| | Back throws | 2kg | 2 / 10 | 40 sec | 2kg | |
| Thursday | Lunge pass | 2kg | 2 / 10 | 40 sec | 2kg | |
| | Chest pass | 2kg | 2 / 10 | 40 sec | 2kg | |
| | Overhead throw | 2kg | 2 / 10 | 40 sec | 2kg | |
| | Single arm toss | 2kg | 2 / 10 | 40 sec | 2kg | |
| | Slams | 2kg | 2 / 10 | 40 sec | 2kg | |
| Friday | Single arm press | 2kg | 2 / 10 | 40 sec | 2kg | |
| | Front raise | 2kg | 2 / 10 | 40 sec | 2kg | |
| | Front squats | 2kg | 2 / 10 | 40 sec | 2kg | |
| | Single leg V-ups | 2kg | 2 / 10 | 40 sec | 2kg | |

| | | | | | | |
|---|---|---|---|---|---|---|
| | Push-ups | 2kg | 2 / 10 | 40 sec | 2kg | |

**RESULTS AND DISCUSSION**

**Table - V**
**COMPUTATION OF ANALYSIS OF COVARIANCE ON CARDIOVASCULAR ENDURANCE**
**(Score in meters)**

| Test | Mean | | | | Source of variance | Sum of square | Degrees of freedom | Mean square | Obtained F |
|---|---|---|---|---|---|---|---|---|---|
| | Aerobic | Medicine ball training | Combined training | Control group | | | | | |
| **Pre test** | 673.33 | 633.33 | 596.67 | 650.00 | **Between** | 46833.33 | 3 | 15611.11 | 1.82 |
| | | | | | **Within** | 480000.00 | 56 | 8571.43 | |
| **Post test** | 760 | 700 | 793.33 | 673.33 | **Between** | 135166.67 | 3 | 45055.56 | 4.17* |
| | | | | | **Within** | 604666.67 | 56 | 10797.62 | |
| **Adjusted** | 723.82 | 705.17 | 836.40 | 661.27 | **Between** | 238208.79 | 3 | 79402.93 | 47.57* |
| | | | | | **Within** | 91788.83 | 55 | 1668.89 | |
| **Mean gain** | 86.667 | 66.66 | 196.66 | 23.33 | | | | | |

***significant** Table F- ratio at 0.05 level of confidence for 3 and 56 (df) = 2.77, 3 and 55 (df) = 2.77

Table – V shows that the pre test mean scores of cardiovascular endurance isolated aerobic exercise group (IAE) was 673.33 meters, isolated medicine ball training group (IMT) was 633.33 meters, combined aerobic exercise and medicine ball training group (CAMT) was 596.67 meters and control group (CG) was 650 meters. The post test means showed difference due to experimental training and mean values recorded were 760, 700, 793.33 and 673. Meters respectively. The obtained F value on pre test scores 1.82 was lesser than the required F value of 2.77 to be significant at 0.05 level. This proved that there were no significant difference between the experimental and control groups indicating that the process of randomization of the groups was perfect while assigning the subjects to groups. The post test scores analysis proved that there was significant difference between the groups, as they obtained F value 4.17 was greater than the required F value of 2.77 this proved that the differences between the post test mean of the subject were significant. Taking into consideration the pre and post test score among the group, adjusted mean scores were calculated and subjected to statistical treatment. The obtained F value of 47.57 was the greater than the F value of 2.77. This proved that there was a significant

difference among the mean due to the experimental training on cardiovascular endurance. Since significant differences were recorded, the results were subjected to post hoc test analysis using Scheffe's confidence interval test. The results were presented in table –IV

**TABLE –VI**
**SCHEFFE'S CONFIDENCE INTERVAL TEST SCORE ON CARDIOVASCULAR ENDURANCE**
**(Score in Meters)**

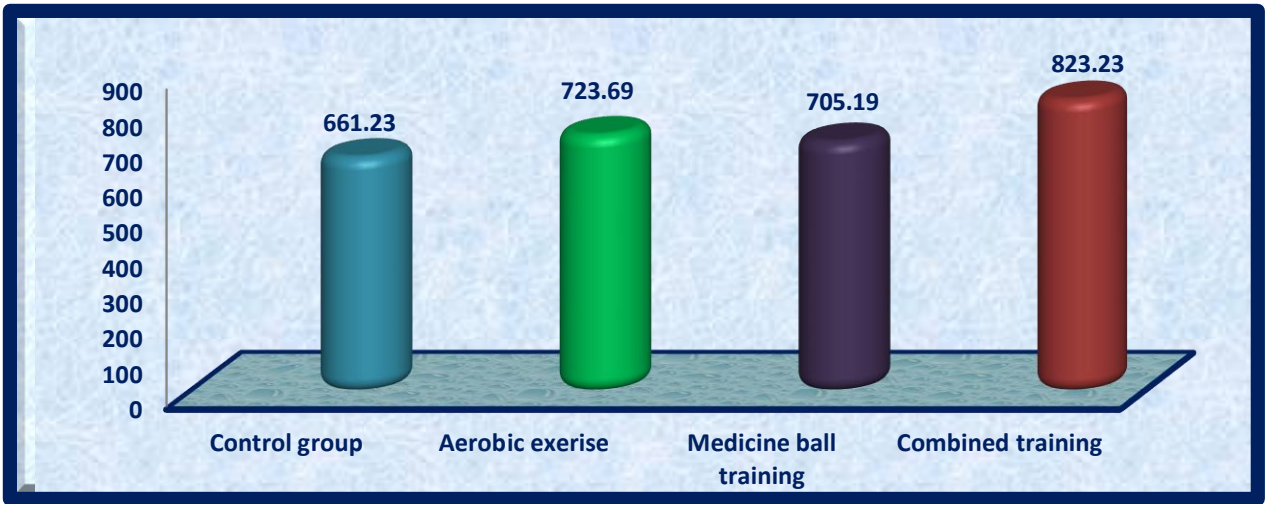
| Aerobic exercise | Medicine ball training | Combined training | Control group | Mean difference | Required C.I |
|---|---|---|---|---|---|
| 723.82 | 705.17 | - | - | 18.65 | 60.81 |
| 723.82 | - | - | 661.27 | 62.55* | |
| - | 705.17 | - | 661.27 | 43.89 | |
| - | - | 836.40 | 661.27 | 175.13* | |
| - | 705.17 | 836.40 | - | 131.23* | |
| 723.82 | - | 836.40 | - | 112.58* | |

***Significant**

The multiple mean comparisons shown in table –VI proved that there existed significant differences between the adjusted means of isolated aerobic exercise (IAE) and control group (CG) isolated medicine ball training group (IMT) and control group (CG) combined aerobic exercise and medicine ball training group (CAMT) and control group (CG), isolated aerobic exercise (IAE) and combined aerobic exercise and medicine ball training group (CAMT), isolated medicine ball training group (IMT) and combined aerobic exercise and medicine ball training group (CAMT). There was significant difference between isolated aerobic exercise (IAE) and isolated medicine ball training group (IMT), isolated medicine ball training group (IMT) and control group (CG).

The ordered adjusted means on cardio vascular endurance were presented through bar diagram for better understanding of the results of this study in figure- 1

**FIGURE – 1**
**BAR DIAGRAM ON ORDERED ADJUSTED MEAN OF CARDIOVASCULAR ENDURANCE**



**DISCUSSION ON THE FINDINGS OF CARDIOVASCULAR ENDURANCE**

The result presented in tables – V and- VI showed that obtained adjusted means on cardiovascular endurance among isolated aerobic exercise group (IAE) was 723.82, isolated medicine ball training group (IMT) was 705.17 followed by combined aerobic exercise and medicine ball training group (CAMT) mean value of 836.40 and control group (CG) mean value of 661.40. The differences among pretest scores, post test scores and adjusted mean scores of the subjects were statistically treated using ANCOVA and F value on pre test scores were significant and the obtained F value on the post test and adjusted means were significant at 0.05 level of confidence as these were greater than the required table F value of 2.77.

The post hoc analysis through Scheffe's confidence test proved that due to six weeks of isolated aerobic exercise group (IAE), isolated medicine ball training group (IMT), combined aerobic exercise and medicine ball training group (CAMT) improved cardiovascular endurance than the control group (CG) and differences were significant at 0.05 level. Further, the post hoc analysis shows that there was significant differences between the experimental groups, clearly indicating that combined aerobic exercise and medicine ball training group (CAMT) was significantly better than the isolated aerobic exercise group (IAE), isolated medicine ball training group (IMT), in improving the cardiovascular endurance of the school boys.

**CONCLUSIONS**

The cardiovascular endurance was significantly improved by experimental groups namely the isolated and combined aerobic exercise and medicine ball training among the school boys. The combined aerobic exercise and medicine ball training was found better in improving cardiovascular endurance than the isolated aerobic exercise and medicine ball training among the school boys.

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