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EFFECT OF DIFFERENT INTENSITY OF STEP AEROBICS TRAINING ON SPEED AND CARDIORESPIRATORY ENDURANCE AMONG SCHOOL GIRLS

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Abstract:

The purpose of the study was to find out the effect of different intensity of step aerobics training on Speed and Cardiorespiratory Endurance among school girls. For this purpose, sixty (60) girls aged between 15 to 17 were randomly selected from the Kannagi Government Girls Higher Secondary School, Villianur, Puducherry, India as subjects. The Training programme was designed for 12 weeks and Experimental group I (n=20) underwent step aerobics with 4 inches step height, Experimental group II (n=20) underwent step aerobics with 8 inches step height for weekly 5 days, 45-60 minutes/day and group III (n=20) acted as control group. Step aerobics is treated as Independent Variable. Speed and Cardio respiratory endurance were selected as motor fitness variables. Pre test and Post test were conducted on selected dependent variables. Analysis of covariance (ANCOVA) was applied to find out the effect of different intensity of step aerobics training on Speed and Cardiorespiratory Endurance among School Girls. The Scheffe's post hoc method was used for testing the significance between paired adjusted means. The level of significance was 0.05. The results of the study showed that speed and Cardio respiratory endurance had significantly improved the Experimental group II than the Experimental group I and the control group.

Key Words: Step Aerobics, Intensity, ANCOVA, Speed & Cardio Respiratory Endurance

Introduction:

Aerobic exercise is a physical activity that uses large muscle groups and makes the body to use more oxygen than it consume while at rest. The goal of aerobic exercise is to increase cardiovascular endurance Such as cycling, swimming, brisk walking, skipping rope, rowing, hiking, playing tennis, long slow distance training etc. Sports training improve the functioning of the circulatory, respiratory and the muscular systems, while practice is largely aimed at improving the control of muscular activity by the nervous system.

Step aerobics is a type of aerobic that involve stepping up on to and down from a portable block. Step aerobics is a form of aerobic power distinguished from other type of aerobic exercise by its use of an elevated platform (the step). The height can be tailored to individual needs inserting risers under the step. Step aerobics helps to burn calories and fat. It also helps to reduce stress, produce restful steep and strengthen muscles and gives body a more streamline appearance. The number of calories burned depends on the speed of movements, step height, and length of exercises. Starters should begin with a low bench level of 4 to 6 inches in height. Advanced steppers may choose to gradually move the step to a final height of 12 inches.

Methodology:

Sixty (N=60) girl students studying in the Kannagi Government Girls Higher Secondary School, Villianur, Puducherry, India were selected as subjects at random and they were divided into three equal groups of twenty subjects each namely Experimental group I (Intensity - 4" step height) and Experimental group II (Intensity - 8" step height) and Control group. The age group of the subjects ranged from 15 to 17 years. Speed and Cardio respiratory endurance were selected as motor fitness variables. 50 m run and cooper's 9 minutes run/walk was administered to measure speed and cardio respiratory endurance of the subjects. In speed the time was recorded in 1/10th seconds**.** In Caridiorepiratory Endurance the distance covered by each subject in 9 minutes were recorded to the nearest tenth meter.

Training Programme:

The training programme included warm-up for 5 to 10 minutes, then step aerobic exercise for 30 – 45 minutes and cool down exercise for 3 to 5 minutes. Jumping jack, over the top, across the top, A-step, tap up, basic right, basic left, grapevine, diagonal and V-step are the 4 count step aerobic exercise that are performed by the subjects. Experimental group I underwent step aerobics training with step height of 4 inches for five days/week 45-60 minutes/day and experimental group II underwent step aerobics training with step height of 8 inches for five days/week 45-60 minutes/day. Control group did not undergo any special training. Pretest and post test was conducted on the selected motor fitness variable before and after 12 weeks of step aerobics training.

Statistical Analysis:

Analysis for covariance (ANCOVA) statistical techniques was used to test the adjusted post-mean differences among the experimental groups. The Scheffe's post hoc test was used to determine the significance of the paired mean differences.

Analysis of Data:

Table 1: Computation of Analysis of Covariance on Speed (Scores in Seconds)

	4-inches Step Aerobics Group	8-inches Step Aerobics Group	Control Group	Source of Variance	Sum of Squares	df	Mean squares	'F' ratio
Pre test Mean	8.88	8.85	8.89	B	0.022	2	0.011	0.06
SD	0.50	0.46	0.38	W	11.42	57	0.20	
Post test Mean	8.61	8.41	8.93	B	2.752	2	1.376	6.03*
SD	0.56	0.47	0.39	W	13.016	57	0.228	
Adjusted Post test Mean	8.60	8.43	8.91	B	2.321	2	1.160	43.59*
				W	1.491	56	0.027	

(Table value required for significance with degrees of freedom 2& 57, 2& 56 are 3.15 and 3.16)

* Significant at 0.05 level of confidence

Result of Speed:

The pre test means of speed were 8.88 for experimental group I, 8.85 for experimental group II and 8.89 for control group. As the obtained F ratio 0.06 was lesser than the table F ratio 3.15, the pre test was not significant at 0.05 level of confidence for degrees of freedom 2 and 57.

The post test means of speed were 8.61 for experimental group I, 8.41 for experimental group II and 8.93for control group. As the obtained F ratio 6.03 was greater than the table

F ratio 3.15, the post test was significant at 0.05 level of confidence for degrees of freedom 2 and 57.

The adjusted post test means of speed were 8.60 for experimental group I, 8.43 for experimental group II and 8.91 for control group. As the obtained F ratio 43.59 was greater than the table F ratio 3.16, the post test was significant at 0.05 level of confidence for degrees of freedom 2 and 56.

Table 2: The Scheffe's Test for the Differences between the Adjusted Post Test Paired Means on Speed (Scores in Seconds)

Exp. Group I	Exp. Group II	Control Group	Mean Difference	Confidence Interval
8.60	8.43		0.17*	0.13
8.60		8.91	0.31*	0.13
	8.43	8.91	0.48*	0.13

* Significant

The above table shows the adjusted post test mean differences on Experimental Group I and Experimental Group II, Experimental Group I and Control Group, Experimental Group II and Control Group are 0.17, 0.31 and 0.48 respectively and they are greater than the confidence interval value 0.13 which shows significant differences at 0.05 level of confidence.

Discussion on the Findings of Speed:

Shaver (1982) stated that the speed is mainly determined by the characteristics of the muscle fibres, arrangement of the bone and the attachment of bones by ligaments, tendons and adequate muscle strength. It primarily depends on the fast twitch fibres. Fast twitch fibres are generally characterized by high anaerobic capacity, rapid contraction, short fatigue time and ability to generate relatively large force. Due to training the involvement of fast twitch fibers, enzymes, co-enzymes, actin, myosin and other myofibril or proteins were greatly increased. It helps to increase the reaction time, movement time, stride length and stride frequencies. Hence there was significant improvement in speed. Awasare (2013) observed the effect of aerobic exercises for a period of 8 weeks on physical fitness and body composition. The results indicated that experimental group showed a significant effect on speed.

Cardio Respiratory Endurance:

Table 3: Computation of Analysis of Covariance on Cardio Respiratory Endurance (Scores in Metres)

	4-inches Step Aerobics Group	8-inches Step Aerobics Group	Control Group	Source of Variance	Sum of Squares	df	Mean squares	'F' ratio
Pre test Mean	1957.5	1945.5	1967.0	B	4643.33	2	2321.67	0.89
SD	46.67	39.53	63.83	W	148490.0	57	2605.09	
Post test Mean	2022.5	2046.5	1962.5	B	74880.0.	2	37440.0	13.30*

SD	45.64	40.04	68.97	W	160405.0	57	2814.12	
Adjusted Post test Mean	2022.0	2056.0	1954.0	B	105958.5	2	52979.2	60.00*
				W	49446.08	56	882.97	

(Table value required for significance with degrees of freedom 2& 57, 2& 56 are 3.15 and 3.16)
* Significant at 0.05 level of confidence

The pre test means of cardio respiratory endurance were 1957.5 for experimental group I, 1945.5 for experimental group II and 1967.0 for control group. As the obtained F ratio 0.89 was lesser than the table F ratio 3.15, the pre test was not significant at 0.05 level of confidence for degrees of freedom 2 and 57.

The post test means of cardio respiratory endurance were 2022.5 for experimental group I, 2046.5 for experimental group II and 1962.5 for control group. As the obtained F ratio 13.30 was greater than the table F ratio 3.15, the post test was significant at 0.05 level of confidence for degrees of freedom 2 and 57.

The adjusted post test means of cardio respiratory endurance were 2022.0 for experimental group I, 2056.0 for experimental group II and 1954.0 for control group. As the obtained F ratio 60.0 was greater than the table F ratio 3.16, the post test was significant at 0.05 level of confidence for degrees of freedom 2 and 56.

Table 4: The Scheffe's Test for the Differences between the Adjusted Post Test Paired Means on Cardio Respiratory Endurance (Scores in metres)

Exp. Group I	Exp. Group II	Control Group	Mean Difference	Confidence Interval
2022.0	2056.0		34.0*	23.62
2022.0		1954.0	68.0*	23.62
	2056.0	1954.0	102.0*	23.62

*Significant

The above table shows the adjusted post test mean differences on Experimental Group I and Experimental Group II, Experimental Group I and Control Group, Experimental Group II and Control Group are 34.0, 68.0 and 102.0 respectively and they are greater than the confidence interval value 23.62 which shows significant differences at 0.05 level of confidence.

Discussion on the Findings of Cardio Respiratory Endurance:

Begarbatta (1958) stated that sportsmen indulging in strenuous sports will have increased efficiency of heart function, circulation, the greater oxygen consumption, greater fatiquability, increased pulmonary ventilation, better extraction and more appetite than sedentary one. Intensity in cardio-respiratory endurance directly affects the body's acute and chronic adaptations by eliciting numerous bodily changes in respiration, resting and sub maximal heart rate, oxygen utilization, stroke volume and blood flow in and out of the muscle. Shahana et. al. **(2010)** determined the effects of the 12 weeks aerobic exercise programme on health related fitness components. It was concluded that Cardio Respiratory Endurance was improved after 12 weeks of aerobic training.

Conclusion:

- ✓ In Speed, the Experimental group II (Intensity – 8" step height) exhibited significantly greater improvement than Experimental group I (Intensity – 4" step height). Hence Experimental group II was significantly better than Experimental group I.
- ✓ In Cardio respiratory endurance, the Experimental group II (Intensity – 8" step height) exhibited significantly greater improvement than Experimental group I (Intensity – 4" step height). Hence Experimental group II was significantly better than Experimental group I.

Recommendations:

- ✓ Step aerobics will be recommended to improve motor fitness variables.
- ✓ High intensity of step aerobics will be practiced to find better effect in the development of motor fitness variables.
- ✓ Step aerobics will be recommended to include in the school physical education curriculum to improve over all development of the children.

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