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Effect of aerobics yoga and resistance training on agility and cardiovascular endurance of sports school students

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Abstract
Forty male students studying in G.V Raja Sports VHS School, Mylam, Trivandrum, Kerala, India selected randomly as subjects. The age of the subjects ranged from 14 to 18 years. They were randomly divided into four groups. Group I underwent aerobic training, group II underwent yoga, group III underwent resistance training practices and group IV acted as control group. Each group consist of 10 subjects each. The training schedule was for a period of 24 weeks. The criterion variables selected for the study were agility and cardio vascular endurance. The data collected for the pre, mid and post test were analysed by using one way repeated measure (ANOVA) and analysis of co variance (ANCOVA). The result of the study reveals that all the criterion variables had significant improvement in all the three experimental groups when compared to control group.

Keywords: Aerobics yoga and resistance training, cardiovascular endurance

Introduction
Games and sports as a part of human education have always existed in the human civilization. Before the dawn of civilization and culture, physical exercise was an important aspect of human existence. In the primitive society, the necessity for continued existence motivated man to keep himself more physically fit and strong enough, in comparison with the stronger forces of nature.

Scientific habits of the mind can help people in every walk of life to sensibly deal with problems that often involve evidence, quantitative considerations, logical argument and uncertainty. Without the ability to think critically and independently, citizens are easy prey to dogmatists, film star artists and purveyors of simple solutions to complex problems (Rutherford and Andrew, 1990).

"Physical activity is an important ingredient in the quality of life because it increases energy and promotes the physical, mental and psychological wellbeing in addition to conferring worthy health habits" (Gopinath, 2008) [6].

Aerobic exercise provides cardiovascular conditioning. The term aerobic actually means "with oxygen," which means that breathing controls the amount of oxygen that can make it to the muscles to help them burn fuel and move

Yoga is "a control of thought waves in the mind." It is as wisdom in work or skilful living amongst activities of harmony and moderation. (Ravi, 1988)

Resistance training is exercise, using resistance (normally weights) to build muscle strength and endurance. In resistance training one can use resistance like dumbbells, weight, bar bells, pulley machines or simply one's own weight as resistance.

Methodology
To achieve the purpose, forty male students studying G.V Raja Sports VHS School, Mylam, Trivandrum, Kerala, India were selected randomly as subjects. The age of the subjects ranged from 14 to 18 years. They were randomly divided into four groups. The experimental groups were subjected to the aerobic training, yogic practices and resistance training in the morning for alternative days for a period of 24 weeks except on Sunday.

The data were collected two days before the training schedule (pre-test); during the middle of the training schedule 12 weeks (mid-test) and two days after the training schedule 24 weeks (post-test). The criterion variables selected for the study are agility and cardiovascular endurance; and were assessed by the following standardized test items such as: shuttle run and 12 minutes run/walk test respectively.

Analysis of the Data and Results of the Study

The data pertaining to the criterion variables selected for the study were examined by using one way repeated measure (ANOVA) for finding the significance difference within the group (pre, mid and post test); in order to find significance difference between the groups (aerobic training, yogic practices and par course training, and control groups) are presented in the following tables.

Agility

Table 1: One way repeated measure ANOVA on Agility of Experimental and Control groups

Group	Source of Variance	Sum of Squares	d.f	Mean Squares	F-ratio
Aerobic training	Test (Between)	1.97	2	0.99	29.12*
	Error	0.62	18	0.034	
Yogic Practices	Test (Between)	1.02	2	0.51	11.86*
	Error	0.78	18	0.043	
Resistance training	Test (Between)	0.38	2	0.19	4.63*
	Error	0.74	18	0.041	
Control group	Test (Between)	0.00	2	0.00	0.00
	Error	0.01	18	0.005	

*Significant at 0.05 level of confidence.

Table 1 reveals the analyzed data on within the group. The obtained F- ratio values are 29.12; 11.86 & 4.63 of aerobic training, yogic practices and resistance training group respectively. The table value required for significance at 0.05 level of confidence with 2 and 18 were 3.55. Based on F-ratio value aerobic training group training proves to be the most significant and resistance training was the least significant among the three experimental groups.

Table 2: Analysis of Covariance of Experimental and Control Groups on Agility

Adjusted Post test Mean				Source of variance	Sum of squares	d.f	Mean squares	F -ratio
Aerobic training	Yogic Practices	Resistance training	Control group					
9.37	9.46	9.54	9.69	Between	2.19	3	0.73	8.67*
				Error	3.03	36	0.08	

*Significant at 0.05 level of confidence

Table 2 reveals that all the three experimental had shown significant improvement in vital capacity among the group. The obtained ANCOVA (F- ratio) values 8.67 shows that the entire experimental groups are significant among themselves and is higher than the table value 2.92 of 3 and 35.

Cardiovascular Endurance

Table 3: One Way Repeated Measure ANOVA on Cardiovascular endurance of Experimental and Control Groups

Group	Source of Variance	Sum of Squares	d.f	Mean Squares	F-ratio
Aerobic training	Test (Between)	692093.75	2	346046.88	33.37*
	Error	186656.25	18	10369.79	
Yogic Practices	Test (Between)	252218.75	2	126109.38	31.19*
	Error	72781.25	18	4043.40	
Resistance training	Test (Between)	57822.92	2	28911.46	10.75*
	Error	48427.08	18	2690.39	
Control group	Test (Between)	510.42	2	255.21	0.04
	Error	129906.25	18	7217.01	

*Significant at 0.05 level of confidence.

Table 3 reveals the analyzed data on cardiovascular endurance within the group. The obtained F- ratio values are 33.37; 31.19 & 10.75 of aerobic training, yoga and resistance training group respectively. The table value required for significance at 0.05 level of confidence with 2 and 18 were 3.55. Based on F-ratio value aerobic training group training proves to be the most significant and resistance training was the least significant among the three experimental groups.

Table 4: Analysis of Covariance of Experimental and Control Groups on Cardiovascular Endurance

Adjusted Post test Mean				Source of variance	Sum of squares	d.f	Mean squares	F – ratio
Aerobic training	Yogic Practices	Resistance training	Control group					
2648.73	2572.95	2534.37	2453.32	Between	793113.78	3	264371.26	17.77*
Error				535479.93	36	14874.44		

*Significant at 0.05 level of confidence.

Table 4 reveals that all the three experimental groups had shown significant improvement in cardiovascular endurance among the groups. The obtained ANCOVA (F- ratio) value 17.77 shows that the entire experimental groups are significant amongst them and is higher than the table value 2.92 of 3 and 35.

Conclusions

The following were the main findings of the study.

1. The aerobic training had achieved better significant improvement than yogic practices and resistance training in the dependent variables such as agility and cardiovascular endurance.
2. Yogic practices had achieved better significant improvement than resistance training in the dependent variable such as agility and cardiovascular endurance.

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