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Isolated and Combined Effect of Aerobic and Pilates Exercise on Selected Motor Fitness Components and Physiological Variables Among Adolescent Boys

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ABSTRACT

The purpose of the study was to find out the isolated and combined effect of aerobic and pilates exercise on selected motor fitness components and physiological variables among adolescent boys. To achieve the purpose of this study, sixty adolescent school boys were selected as subjects at random from MAJPM Higher Secondary School, Raniganj, Pratapgarh (U.P.). Their age ranged from 14 to 17 years. The subject were divided into three experimental group and one control group, each group consist of 15 subjects. Experimental group I undergone aerobic exercise, Experimental group II undergone pilates exercise, Experimental group III undergone combined exercise for the period of twelve weeks. The control group IV did not participate or involved any specific training programme other than their regular physical activities programme as per their school curriculum. The subjects were tested before and after the experimentation on flexibility and resting heart rate. The obtained data from experimental and control group were statistically analyzed with analysis of covariance (ANCOVA). The experimental group had achieved a significant improvement on flexibility and resting heart rate when compared to the control group.

KEYWORDS : aerobic exercise, pilates exercise, flexibility, resting heart rate

INTRODUCTION

Aerobic exercise is exercise that involves or improves oxygen consumption by the body. Aerobic means with oxygen and refers to the use of oxygen in the body's metabolic process. Aerobic exercise is the key component of health. It improves the heart ability to pump blood more effectively as well as increases the blood's oxygen carrying capacity. Aerobics refers to variety of exercises that stimulate heart and lung activity for a time period sufficiently long to provide beneficial changes in the body.

Pilates is a method of exercise, which is developed by Joseph H. Pilates 80 years ago. Pilates is one of the fastest growing forms of exercise in the world. Pilates is a series of controlled movements engaging your body and mind, performed by specifically designed exercise apparatus. Pilates exercise is an exercise system that focuses on building strength without bulk, improves flexibility and agility, and helps to prevent and rehabilitates injury. Pilates involves a series of controlled movements that engage both your body and mind. It was initially created for rehabilitation. The primary focus is on awareness of the spine, proper breathing, core strength, flexibility and alignment. The outcome of Pilates training is a balanced body which is strong, supple, toned and healthy**.**

METHODOLOGY

To achieve the purpose of this study, sixty adolescent school boys were selected as subjects at random from MAJPM Higher Secondary School, Raniganj, Pratapgarh (U.P.). Their age ranged from 14 to 17 years. The subjects were divided into three experimental group and one control group, each group consist of 15 subjects. Experimental group I undergone aerobic exercise, Experimental group II undergone pilates exercise, Experimental group III undergone combined exercise for the period of twelve weeks. The control group IV did not participate or involved any specific training programme other than their regular physical activities programme as per their school curriculum. Sit and Reach test was used to find out the flexibility and Numbers of heart beat per minute was used to find out the resting heart rate. The data were collected before and after the training programme and analysed by analysis of covariance. The result of the study shows that aerobic exercise, pilates exercise and combined exercise were statistically significant at 0.05 level when compared with the control group.

Data Analysis

The standardized protocol was used to collect the relevant data which were statistically analysed by using analysis of covariance. In case of mean difference being significant, scheffe's test as applied to find out the paired mean differences among the groups on flexibility and resting heart rate.

RESULTS

Table-I: Analysis of Covariance for Pre Test and Post Test Data on Flexibility of Experimental Groups and Control Group

	Group				SV	df	SS	MSS	F Ratio
	Control	Aerobic	Pilates	Combined					
Pre test Mean	0..90	0.95	0.91	72	B	3	5.142	1.714	2.23
S.D.	19.41	19.58	19.53	18.85	W	56	43.044	.769	
Post test Mean	0.81	1.08	1.16	1.24	B	3	99.551	33.184	35.087*
S.D.	19.52	21.67	23.14	21.53	W	56	52.963	.946	
Adjusted post test	19.46	21.46	22.97	21.97	B	3	97.936	32.645	91.126*
					W	55	19.703	.358	

***Significant at 0.05 level.**

Required table value at 0.05 level of significance for 3 & 56 and 3 & 55 degree of freedom = 2.77

In the table I, the analysis of covariance for flexibility (sit & reach test) showed that the resultant for 'F' ratio of 2.23 was not significant in case of pre test means indicating that the initial mean difference among the groups was not significant. The post test means and the differences between the adjusted means yielded the 'F' ratio of 35.087 and 91.126 respectively and were found significant. The 'F' ratio, needed for significance at 0.05 level of confidence is 2.77. As the difference between the post-test means and the adjusted means for four groups were found significant. Scheffe's post hoc test was applied to find out the differences between the paired adjusted means were most significant. Differences between the paired adjusted means of cardiovascular endurance are shown in table II.

Table-II: Scheffe's post hoc test for the Differences between the Adjusted Means of Experimental Groups and Control Group on flexibility

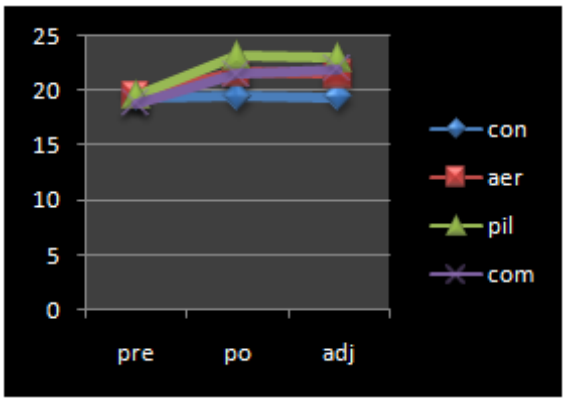
Groups				MD	CI
Control	Aerobic	Pilates	Combined		
19.46	21.46			2.00*	0.629
19.46		22.97		3.51*	
19.46			21.97	2.51*	
	21.46	22.97		1.51*	
	21.46		21.97	0.51	
		22.97	21.97	1.00*	

*Significant at 0.05 level. Scheffe's confidence Interval at 0.05 level is 0.629

The table II, shows that the mean difference of aerobic exercise group and control group, pilates exercise group and control group, combined exercise group and control group, aerobic exercise group and pilates exercise group and pilates exercise group and combined exercise group were found to be significant. It is also noted that aerobic exercise group and combined exercise group not showed significant difference on flexibility.

The pre test, post test and adjusted post test means valued of aerobic exercise group, pilates exercise group, combined exercise group and control group on flexibility are graphically presented in figure I.

Figure- I



The differences in means of Aerobic, Pilates group, Combined and Control group

Table-III: Analysis of Covariance for Pre Test and Post Test Data on Resting Heart Rate of Experimental Groups and Control Group

	Group				SV	df	SS	MSS	F Ratio
	Control	Aerobic	Pilates	Combined					
Pre test Mean	2.37	2.20	2.15	2.66	B	3	14.80	4.933	0.890
S.D.	81.07	80.47	80.07	79.73	W	56	310.53	5.545	
Post test Mean	2.23	2.37	2.82	2.50	B	3	218.45	72.817	13.188*
S.D.	80.60	76.07	78.07	75.87	W	56	309.20	5.521	
Adjusted post test	79.94	75.95	78.31	76.41	B	3	149.035	49.678	47.164*
					W	55	57.932	1.053	

*Significant at 0.05 level.
Required table value at 0.05 level of significance for 3 & 56 and 3 & 55 degree of freedom = 2.77

In the table III, the analysis of covariance for resting heart rate showed that the resultant for 'F' ratio of 0.89 was not significant in case of pre test means indicating that the initial mean difference among the groups were not significant. The post test means and the differences between the adjusted means yielded the 'F' ratio of 13.188 and 47.164 respectively and were found significant. The 'F' ratio, needed for significance at 0.05 level of confidence is 2.77. As the difference between the post-test means and the adjusted final means for four groups were found significant. Scheffe's post hoc test was applied to find out the differences between the paired adjusted means were most significant. Differences between the paired adjusted means of resting heart rate are shown in table IV.

Table-IV: Scheffe's post hoc test for the Differences between the Adjusted Means of Experimental Groups and Control Group on resting heart rate

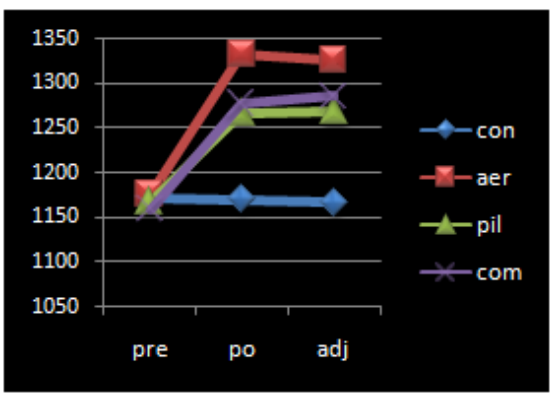
Groups				MD	CI
Control	Aerobic	Pilates	Combined		
79.94	75.95			3.99*	1.079
79.94		78.31		1.63*	
79.94			76.41	3.53*	
	75.95	78.31		2.36*	
	75.95		76.41	0.46	
		78.31	76.41	1.90*	

*Significant at 0.05 level. Scheffe's confidence Interval at 0.05 level is 1.079

The table IV, shows that the mean difference of aerobic exercise group and control group, pilates exercise group and control group, combined exercise group and control group, aerobic exercise group and pilates exercise group and pilates exercise group and combined exercise group were found to be significant. It is also noted that aerobic exercise group and combined exercise group not showed significant difference on resting heart rate.

The pre test, post test and adjusted post test means valued of aerobic exercise group, pilates exercise group, combined exercise group and control group on flexibility are graphically presented in figure II.

Figure- II



The differences in means of Aerobic, Pilates group, Combined and Control group

DISCUSSION

The findings of the study on flexibility and resting heart rate reveal that the experimental groups namely aerobic exercise group, pilates exercise group and combined exercise group had significantly improved after the training. Besides, the result of the study indicated that there was a significant difference between the aerobic exercise group and pilates exercise group and pilates exercise group and combined exercise group. At the same time there was no significant difference was existed between aerobic exercise group and combined exercise group. The above finding was observed and made by the following studies. Rajeev (2013) analyzed the effect of pilates exercise calisthenics exercise and combination of pilates and calisthenics exercise on flexibility & strength of school boys and found significant. Shiv & Abhilash, (2012) analyzed the Effect of Yogasanas and Pilates Exercise on Flexibility and Cardiovascular Endurance and found significant.

CONCLUSION

In summary, the results of this investigation indicate that all the three experimental significantly improved the flexibility and resting heart rate. More specifically, Pilates exercise group is better than the Aerobic exercise group and combined exercise group on flexibility, Aerobic exercise group is better than the Pilates exercise group and Combined exercise group on resting heart rate and there is no significant difference between aerobic exercise and combined exercise on flexibility and resting heart rate.

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