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Effect of Aerobic Training on Selected Physical and Physiological Variables among Normal and Overweight College Women

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Abstract

The purpose of the study was to examine the influence of aerobic training on physical and physiological variables among college level women. For the study 90 student's age ranging from 17 to 21 were selected for a 6 weeks aerobic exercise training program. The selected subjects were divided into two equal group namely normal weight and overweight. The normal and overweight students further divided into three equal groups namely group A, group B and group C (N=15) in each group. Group A of normal and overweight were treated as experimental group I, group B of normal and overweight were treated as experimental group II and group C of normal and overweight were treated as control group. Floor aerobic exercise training was given to experimental group I, aerobic exercise training was given to experimental group II and control group did not participate in any training apart from their daily routine work. The pre and post test were conducted on the selected physical variable muscular strength and physiological variable respiratory rate. The data pertaining to selected physical and physiological variables were analyzed by ANCOVA at $P < 0.05$ and it concluded that experimental group showed improvement than control group.

Keywords: Aerobic Exercise, Muscular Strength, Respiratory Rate, College Level Women.

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Introduction

Physical activity is done by the each and every individual. Every human being participates in some kind of sports activity or physical exercise during the course of his life. This exercise may assume different forms for different individuals. It may be walking, jogging, cycling, working in a factory, participation in games and sports etc. Regular participation in exercise programme markedly influences physical, physiological and mental fitness of an individual. Physical fitness is a dynamic construct in that it is continually growing and plays an important role to everyday life. Physical fitness is the ability to carry out daily tasks with vigour and alertness without undue fatigue and ample energy to enjoy leisure time pursuits and meet unforeseen emergencies. Through aerobic exercise one can maintain their physical fitness. It is widely acknowledged that physical activity is essential to children's growth and development. Regular physical activity can have a positive impact on students' physical, mental, and social well-being. In particular, physical activity is likely to have an impact on students' achievement, readiness to learn, behavior and self-esteem. Positive experiences with physical activity at a young age also help lay the foundation for healthy, productive lives. In sports participation or for better

performance one requires physical fitness components that can be achieved through regular aerobic exercise as aerobic exercise keeps everyone super-fit and healthy.

Aerobic exercise includes physical activity that increases our heart rate and keeps it higher for a certain period of time. It boosts the amount of oxygen delivered to our heart and muscles so they use oxygen more efficiently, and stay healthier. Muscular strength refers to the capacity to do work against any resistance. All physical activities of daily life require muscular strength as walking, sitting, picking any object, running etc. It also helps in prevention from any injuries and keeps early aging away. Proper breathing is essential during exercise as good breathing pattern ensures that our working muscles will continue to receive the oxygen they need to keep contracting.

Methodology

The main objective of the study was to see the effect of aerobic exercise on selected physical and physiological variables of college level women. For the purpose of study 90 women age ranging from 17 to 21 were selected from Selvam College of Physical Education, Namakkal. The selected students were equally divided into two equal groups namely normal and overweight. They were further divided into three equal groups A, B & C consisting of 15 students in each group. Group A of both normal and overweight group were assigned as experimental group I, group B of both normal and overweight were assigned as experimental

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group II and group C of both were assigned as control groups. The experimental group I underwent 6 weeks floor aerobic exercise and experimental group II underwent aerobic exercise training and control group did not participate in any exercise program apart from their regular curricular activities. Floor aerobic exercises were done in a hall while aerobic exercises were done in the ground. Among the physical variable muscular strength was measured by administering pushups test, the

correct pushups were recorded in number and physiological variable respiratory rate was measured by manual method, the rise and fall movement of the thorax-abdominal of subject was observed and number of respiration per minutes were recorded. The data were collected at prior and immediately after the exercise program for each criterion variables. Analysis of variance (ANCOVA) was applied for analyze the data at $P < 0.05$ level.

Results

Table 1

Analysis of Co-Variance on Muscular Strength between Experimental Group I, II and Control Group of Normal Weight College Women

Muscular Strength	Floor Aerobic Exercise	Aerobic Exercise	Control Group	Source of Variance	Sum of Square	df	Mean Square	F 'Ratio'	Sig.
Pre test	18.00	17.27	18.87	B	19.24	2	9.62	0.36	0.69
				W	1106.67	42	26.35		
SD	6.15	4.53	4.55	-	-	-	-		
Post test	22.80	22.33	18.93	B	133.64	2	66.82	3.28*	0.04
				W	854.67	42	20.35		
SD	5.70	4.19	3.32	-	-	-	-		
Adjusted post test	22.84	22.99	18.24	B	215.57	2	107.79	65.78*	0.00
				W	67.18	41	1.64		

Table 1 showed that the pre test mean value of experimental group I, II and control group were 18.00, 17.27 and 18.87 respectively. The obtained 'F-ratio' value is 0.36 which is insignificant at $P < 0.05$. The post test mean value of experimental group I, II and control group were 22.80, 22.33 and 18.93. The obtained 'F-

ratio' value is 3.28 showing significant at $P < 0.05$. The adjusted post test mean values were 22.84, 22.99 & 18.24. The obtained F-ratio for the adjusted post test was found to be significant and the value is 65.78. The scheffe's test was applied as post hoc test to find out the paired mean differences if any.

Table 2

Scheffe's Post-Hoc Test for Paired Mean Difference Among The Groups for Muscular Strength on Normal Weight College Women

Floor Aerobic Exercise Group	Aerobic Exercise Group	Control Group	Mean Difference	CD
22.84	22.99	-	0.15	
22.84	-	18.24	4.6*	1.19
-	22.99	18.24	4.75*	

Table 2 showed that the mean difference value between floor aerobic exercise group and aerobic exercise group was 0.15 which was lesser than required critical difference value 1.19 for significance. The mean

difference value between floor aerobic exercise and aerobic exercise group were found significant when compared to control group, the values were 4.6 and 4.75 respectively.

Table 3

Analysis of Co-Variance on Muscular Strength Between experimental Group I, II and Control Group of Overweight College Women

Muscular Strength	Floor Aerobic Exercise	Aerobic Exercise	Control Group	Source of Variance	Sum of Square	df	Mean Square	F 'Ratio'	Sig.
Pre test	19.53	19.87	18.40	B	17.73	2	8.87	0.36	0.70
				W	1045.07	42	24.88		
SD	5.04	4.60	5.30	-					
Post test	21.67	23.53	18.20	B	219.73	2	109.87	5.44*	0.08
				W	847.47	42	20.18		
SD	4.40	4.40	4.66	-					
Adjusted post test	21.44	23.02	18.94	B	124.41	2	62.21	34.04*	0.00
				W	74.92	41	1.83		

Table 3 showed that the pre test mean value of experimental group I, II and control group were 19.53, 19.87 and 18.40 respectively. The obtained 'F-ratio' value is 0.36 which is insignificant at $P < 0.05$. The post test mean value of experimental group I, II and control group were 21.67, 23.53 and 18.20. The obtained 'F-

ratio' value is 5.44 showing significant at $P < 0.05$. The adjusted post test mean values were 21.44, 23.02 & 18.94. The obtained F-ratio for the adjusted post test was found to be significant and the value is 34.04. The scheffe's test was applied as post hoc test to find out the paired mean differences if any.

Table 4

Scheffe's Post-Hoc Test for Paired Mean Difference Among The Groups for Muscular Strength on Overweight College Women

Floor Aerobic Exercise Group	Aerobic Exercise Group	Control Group	Mean Difference	CD
21.44	23.02	-	1.58*	1.24
21.44	-	18.94	2.5*	
-	23.02	18.94	4.08*	

Table 4 showed that the mean difference value between floor aerobic exercise, aerobic exercise and control group were found significant when compared to each other. The required critical difference value for

significance was 1.24. The mean difference value between floor aerobic, aerobic exercise and control group were 1.58, 2.5 and 4.08 respectively.

Table 5

Analysis of Co-Variance on Respiratory Rate Between Experimental Group I, II and Control Group of Normal Weight College Women

Respiratory Rate	Floor Aerobic Exercise	Aerobic Exercise	Control Group	Source of Variance	Sum of Square	df	Mean Square	F 'Ratio'	Sig.
Pre test	25.47	27.40	25.33	B	40.13	2	20.07	1.90	0.162
				W	442.67	42	10.54		
SD	3.56	3.81	2.09	-					
Post test	22.60	22.87	24.80	B	43.24	2	21.62	3.44*	0.041
				W	263.73	42	6.28		
SD	2.69	2.69	2.08	-					
Adjusted post test	23.01	21.95	25.30	B	83.35	2	41.68	30.04*	0.000
				W	56.88	41	1.39		

Table 5 showed that the pre test mean value of experimental group I, II and control group were 25.47, 27.40 and 25.33 respectively. The obtained 'F-ratio'

value is 1.90 which is insignificant at $P < 0.05$. The post test mean value of experimental group I, II and control group were 22.60, 22.87 and 24.80. The obtained 'F-

ratio' value is 3.44 showing significant at $P < 0.05$. The adjusted post test mean values were 23.01, 21.95 & 25.30. The obtained F-ratio for the adjusted post test was

found to be significant and the value is 30.04. The scheffe's test was applied as post hoc test to find out the paired mean differences if any.

Table 6

Scheffe's Post-Hoc Test for Paired Mean Difference Among The Groups for Respiratory Rate on Normal Weight College Women

Floor Aerobic Exercise Group	Aerobic Exercise Group	Control Group	Mean Difference	CD
23.01	21.95		1.06	
23.01		25.30	2.29*	1.09
	21.95	25.30	3.35*	

Table 6 showed that the mean difference value between floor aerobic exercise group and aerobic exercise group was 1.06 which was lesser than required critical difference value 1.09 for significance. The mean

difference value between floor aerobic exercise and aerobic exercise group were found significant when compared to control group, the values are 2.29 and 3.35 respectively.

Table 7

Analysis of Co-Variance on Respiratory Rate Between Experimental Group I, II and Control Group of Overweight College Women

Respiratory Rate	Floor Aerobic Exercise	Aerobic Exercise	Control Group	Source of Variance	Sum of Square	df	Mean Square	F 'Ratio'	Sig.
Pre test	26.60	27.33	25.40	B	28.58	2	14.29	1.53	0.229
				W	392.53	42	9.35		
SD	3.25	3.37	2.47	-	-	-	-		
Post test	22.80	23.67	25.33	B	49.73	2	24.87	3.61*	0.036
				W	289.07	42	6.88		
SD	2.48	3.13	2.16	-	-	-	-		
Adjusted post test	22.68	22.97	26.15	B	105.04	2	52.52	43.24*	0.00
				W	49.80	41	1.21		

Table 7 showed that the pre test mean value of experimental group I, II and control group were 26.60, 27.33 and 25.40 respectively. The obtained 'F-ratio' value is 1.53 which is insignificant at $P < 0.05$. The post test mean value of experimental group I, II and control group were 22.80, 23.67 and 25.33. The obtained 'F-

ratio' value is 3.61 showing significant at $P < 0.05$. The adjusted post test mean values were 22.68, 22.97 & 26.15. The obtained F-ratio for the adjusted post test was found to be significant and the value is 43.24. The scheffe's test was applied as post hoc test to find out the paired mean differences if any.

Table 8

Scheffe's Post-Hoc Test for Paired Mean Difference Among the Groups for Respiratory Rate on Overweight College Women

Floor Aerobic Group	Aerobic Exercise Group	Control Group	Mean Difference	CD
22.68	22.97		0.29	
22.68		26.15	3.47*	1.02
	22.97	26.15	3.18*	

Table 8 showed that the mean difference value between floor aerobic exercise group and aerobic exercise group was 0.29 which was lesser than required critical difference value 1.02 for significance. The mean difference value between floor aerobic exercise and aerobic exercise group were found significant when compared to control group, the values are 3.47 and 3.18

respectively.

Discussion on Findings

The experimental groups of normal weight and overweight were undergone floor aerobic exercise and aerobic exercise training which were assigned to them. From the result analysis it is evident that there

is significant changes was noticed after six weeks training on muscular strength and respiratory rate.

Conclusion

It is concluded that there is an improvement in the performance of the experimental group school boys on muscular strength and respiratory rate due to the effect of aerobic exercise. There was an increase in the number of pushups while number of respiration per minute's decreases among experimental group students in contrast to control group.

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