Effect of Treadmill with and Without Inclination on Selected Cardio-Respiratory Endurance

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Abstract

The purpose of the study was to find out the effect of treadmill running with and without inclination on selected cardio-respiratory. To achieve this purpose thirty male students studying in B.P.E. and M.P.Ed. Degree course in the Department of Physical Education and Sports Sciences, Annamalai University were selected. They were divided into three equal groups (N=30) and each group consisted of 10 subjects. Group - I underwent Treadmill run with inclination of 5 degrees, group - II underwent treadmill run without any inclination and group - III acted as control. The training period for both the experimental groups was three days per week for eight weeks and control group who did not participate any special training apart from the regular curricular activities. Cardio-respiratory endurance was selected as criterion variable and measured by Coopers 12 minute run and walk test. The data was collected among three groups before and after the training. The collected data was analysed by Analysis of Covariance (ANCOVA). The result of the study showed that there was a significant difference between groups on cardio-respiratory endurance. The treadmill run group with five degree inclination showed 9.48% improvement in cardio-respiratory endurance than other groups.

KEYWORDS: Cardio Respiratory Endurance, Treadmill,

Introduction

Aerobic fitness may be defined as the ability to deliver oxygen to the exercising muscles and to utilize it to generate energy during exercise. Aerobic fitness therefore depends upon the pulmonary, cardiovascular and haematological components of oxygen delivery and the oxidative mechanisms of the exercising muscle. Maximal oxygen uptake (VO_2max), the highest rate at which an individual can consume oxygen during exercise, is widely recognized as the best single measure of adults' aerobic fitness. Numerous studies suggest that VO_2max is highly related to endurance performance.

Cardiorespiratory adaptations to a period of endurance training have been well documented. Endurance training elicited improvement in maximal oxygen uptake (Ekblom, 1969; Saltin, *et al*., 1968) and endothelial function (Wisløff, *et al*., 2007; Meyer, *et al*., 2006), and is now increasingly recommended in the prevention and treatment of overweight and obese (Haskell, *et al*., 2007). Treadmills provide a convenient way to exercise at steady state, it is designed to create an uphill climbing effect to make the workouts more strenuous and result in improvement in cardiorespiratory fitness. The purpose of the study was to find out the effect of treadmill running with and without inclination on cardiorespiratory endurance.

Methodology

Subjects

The purpose of the study was to find out the effect of treadmill running with and without inclination on selected cardio respiratory of Annamalai University male

students. To achieve this purpose thirty male students studying in B.P.E. and M.P.Ed., degree course in the Department of Physical Education and Sports Sciences, Annamalai University were selected. They were divided into three equal groups (N=30) and each group consisted of 10 subjects. Group - I underwent treadmill run with inclination of 5 degrees, group - II underwent treadmill run without any inclination and group - III acted as control. The training period for both the experimental groups was three days per week for eight weeks and control group who did not participate any special training apart from the regular curricular activities.

Variables and test

Cardiorespiratory endurance was selected as criterion variables and measured by Cooper's 12 minutes run and walk test.

Protocol

The experimental group with 5 degree inclination and without inclination performed aerobic training 3 days per week for 8 weeks. The experimental groups performed 10 min warm-up followed by moderate intensity running continuously for 45 min at 60–70% of HRmax to ensure that the training protocols was monitored using polar heart rate monitor (Rognmo, *et al*., 2004). The control group who did not performed any special training. The data was collected before and after 8 weeks of training.

Statistical technique

The selected cardiorespiratory endurance was statistically examined by applying analysis of covariance (ANCOVA). When *F* ratio was found significant, Scheffe' S post hoc test was applied. The data was analysed with SPSS statistical package (16 version). The criterion for significance was set at an alpha level of $p < 0.05$.

Result

The analysis of covariance on cardio-respiratory endurance 'of treadmill run with and without inclination groups and control group were analysed and presented in Table - I

Table -I

Analysis of covariance on cardio-respiratory endurance of experimental groups and control group

Tests	Exp Group 1	Exp Group II	Con Group	SOV	SS	df	MS	*F*
Pre test (Mean ± S.D)	1593.00 ± 52.71	1606.00 ± 45.20	1604.0 ± 81.81	B	980.00	2	490.00	0.128
				W	103490.0	27	3832.96	
Post test (Mean ± S.D)	1744.00 ± 40.33	1655.00 ± 52.12	1577.0 ± 80.70	B	139646.7	2	69823.3	19.30*
				W	97700.0	27	3618.52	
Adjusted (Mean ± S.D)	1750.49	1650.94	1574.6	B	154642.4	2	77321.3	68.10*
				W	29519.5	26	1135.37	

* Significant at .05 level of confidence. (df 2 and 27 = 3.35; df 2 and 26 = 3.37)

Table -I showed that the pre-test mean values of cardio respiratory endurance for treadmill run with 5 degrees inclination and treadmill run without inclination groups and control group were 1593.00 ± 52.715, 1606.00 ± 45.20 and 1604.00 ± 81.81 respectively. The obtained 'F' ratio value of 0.128 for pre test scores of treadmill run with 5 degrees inclination and treadmill run without inclination groups and control group on cardio-respiratory endurance was less than the required table value

of 3.35 for significance with df 2 and 27 at .05 level of confidence.

The post-test mean values for cardio-respiratory endurance for experimental groups I and II and control group were 1744.00± 40.33, 1655.00 ± 52.12 and 1577.00 ± 80.70 respectively. The obtained 'F' ratio value of 19.30 for post-test scores of experimental groups I and II and control group was greater than the required table value of 3.35 for significance with df2 and 27 at .05 level of confidence.

The adjusted post-test mean values of cardio-respiratory endurance for experimental groups I and II and control group were 1750.49, 1650.94 and 1574.6 respectively. The obtained 'F' ratio values of 68.10 for adjusted post-test scores of experimental groups I and II and control group were greater than the required table value of 3.37 for significance with df 2 and 26 at 0.05 level of confidence.

The above statistical analysis indicates that there was a significant increase in cardio-respiratory endurance after the training period. Further to determine which of the paired means has a significant increase, Schefte S test was applied. The result of the follow-up test is presented in Table - II.

Table -II

Scheffe S Test for the difference between the adjusted post -test mean on cardio-respiratory endurance

Adjusted Post-test Mean				
Exp Group I	**Exp Group II**	**Con Group**	**Mean Difference**	**Confidence interval at .05 level**
1750.49	-	1574.6	175.89*	38.28
1750.49	1650.94	-	99.55*	38.28
-	1650.94	1574.6	76.34*	38.28

*Significant at .05 level of Confidence

Table - II shows that the adjusted post-test mean difference in cardio-respiratory endurance between experimental group – I and control group was 175.89, which is significant at .05 level of confidence. The adjusted post-test mean difference between the experimental group - II and control group was 76.34. The adjusted post-test mean difference between experimental group – I and experimental group - II was 99.55, which was also significant at .05 level of confidence.

It may be concluded from the results of the study that there was a significant improvement of cardio-respiratory endurance after the treadmill running activities. The mean values of experimental group - I and II and control group were graphically represented in Figure -1

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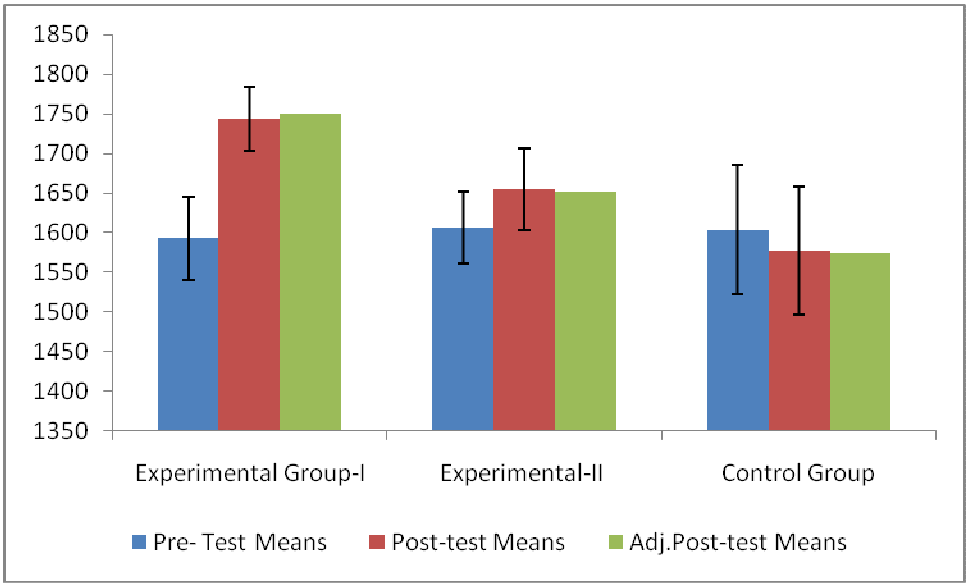

Figure- 1 Bar Diagram Showing the Mean Values of Experimental Groups and Control Groups on Cardio-respiratory Endurance

Discussion

The results of the study has shown that there was a significant improvement has occurred after the treadmill run with and without inclination groups when compared with the control group on selected criterion variables. The results of the study showed that there was a significant difference between treadmill run with and without inclination groups and control group on cardio-respiratory endurance. There was a significant difference has occur on cardio-respiratory endurance after the training. The result of the present study are in accordance with Macbeth (1974); Raja (1992); Mota et al., (2009).

Conclusion

There significant between difference was a experimental groups and control group on cardio-respiratory endurance. But the treadmill run with inclination group have better cardio-respiratory when improvement endurance in compared with the treadmill run without inclination group and control group.

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