



P-ISSN: 2394-1685
E-ISSN: 2394-1693
Impact Factor (ISRA): 5.38
IJPESH 2019; 6(1): 65-70
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www.kheljournal.com
Received: 04-11-2018
Accepted: 06-12-2018

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Comparative effect of three types aerobic training on selected physiological variables of tribal boys

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Abstract

The aim of this study was to find out the comparative effect of three types aerobic training on selected physiological variables of tribal boys. To achieve the purpose of the study 120 school male students were selected as subject at random from Machatora union high school and Lakshmisagar high school in Bankura district of West Bengal and age ranged of the subject is between 14 to 16years. The subject was divided into four group namely Control Group (A), Continuous Training Group (B), Fartlek Training Group (C) and Interval Training Group (D), underwent to Continuous running training for group B, underwent to Fartlek training for group C, underwent to Interval training for group D and group A act as a control group they did not participate in any of the training programme other than their regular activates. Physiological variable- cardio respiratory endurance and resting heart rate were selected for this study. The trainings were given for a period of twelve weeks. The data were collected before and after the training. The obtained data's were analyzed by Analysis of Covariance (ANCOVA). The level of significant was fixed at 0.05 levels. Tukey's post hoc test was applied to determine the significant differences between the paired adjusted means. The result of the study showed that there was as significantly improvement was found in cardio respiratory endurance and resting heart rate among the experimental group when compared with control group.

Keywords: Aerobic training, physiological variables

Introduction

Sports and games as a branch of physical education perhaps may be viewed as that aspect of human movement, which effectively strengthens the integration of body and mind. Recently, it is felt that apart from the purposeful use of physical activities and games as a measure of maintenance of general health, happiness and fitness for effective and efficient living, there are many psychological, sociological and personal factors that develop among participants rather develop total personality. Sports training refer to specialized strategies and methods of exercise used in various sports to develop players and athletes and prepare them for performing in sporting events. There are now a diverse range of sports training methods to be found. The main building blocks in all sports are endurance, speed and heart rate. Nowadays the concept of the mind and its development is also considered a prerequisite to sporting success.

Statement of the Problem

The purpose of the study was to determine the comparative effect of three types aerobic training on selected physiological variables of tribal boys.

Objectives of the Study

The following objectives were framed for the purpose of the study:

1. To assess the effect of continuous training programme on Physiological variables of tribal school boys.
2. To assess the effect of Fartlek training programme on Physiological variables of tribal school boys.
3. To assess the effect of Interval training programme on Physiological variables of tribal school boys.

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4. To compare the effect of continuous training, fartlek training and interval training programme on Physiological variables.

Hypothesis

It was hypothesized that there would be no significant differences due to application of three type of Aerobic training i.e., Continuous Running, Fartlek and Interval training for 12 weeks on selected physiological variables of school level tribal boys.

Delimitation

1. This study was delimited to 120 school level tribal boys studying in grade 8th and 9th.
2. Three types of Aerobic training i.e., Continuous running, Fartlek and Interval training were applied as Experimental Treatment.

Selection of Subjects

One hundred twenty (120) Tribal School Boys (Eighth & Ninth grade) were selected randomly out of 150 Tribal students of Machatora Union High School and Lakshmisagar High School of district Bankura, West Bengal, as the subjects of this study. The ages of the subjects were ranging from 14 years to 16 years of age (Average 14.9). All the Subjects were sub divided into four equal groups (N=30 in each group). Three groups were projected as Experimental groups and designated as Continuous Training Group, Fartlek Training Group and Interval Training Group. One group was termed as control group. Three experimental groups were being exposed to the aerobic trainings (Continuous Training, Fartlek Training and Interval Training) assigned to them. The control group was being kept away from any such training assigned to the experimental groups.

Selection of Variables

The choice of physiological variables and anthropometric variables were made by using the following criteria- Through review of all the available scientific literature related with sports performance from different library of India, Constructive discussions with the supervisor and other experts, Keeping the feasibility criterion especially in the case of availability of instruments, measuring techniques and acceptability of the test items were discussed with the supervisor and others. On the basis of these points the following variables were selected:

Physiological Variables.

- a) Cardio Respiratory Endurance
- b) Resting Heart Rate

Criterion Measures

Physiological Variables

- Cardio Respiratory Endurance was measured by 12 minute Run and Walk test. The score were recorded to the nearest 10 meters.
- Resting Heart Rate was measured by the number of heart beats per minute during resting condition.

Experimental Design

Random group design was adopted for the study as all the subjects were randomly selected and divided into four groups. Further the experimental treatments also were assigned at random to all three experimental groups and the one group served as the control group. Three experimental groups were participated in three training programmes i.e. Group B (Continuous Training) and Group C (Fartlek Training) and Group D (Interval training) respectively. The study was conducted for a period of 12 weeks in the month from January to march. The subjects were voluntarily ready to undergo prescribed training for their respective groups. The scholar briefed the subjects about the objectives of the study and also explained the training schedule and execution of activities of the respective groups in details with practical demonstration.

Collection of Data

The data was collected for each variable administering their respective tests. The tests were administered at Sports ground of Machatora Union High School and Lakshmisagar High School of district Bankura, West Bengal. To ensure that the data collected was reliable, each subject was given sufficient number of trials to perform the respective test for each variable. The data were collected before the starting of experimental treatment (pre-test) and the end of training period (post-test). The tests used were explained to the subjects prior to their administration. The subjects were given chance to practice the tests and made them familiar with.

Statistical Techniques

Analysis of Covariance (ANCOVA) statistics was applied to find out the significant differences among three experimental groups i.e., Continuous Training Group, Fartlek training group and Interval Training Group and with the control group respectively on selected physiological variables i.e., cardio respiratory endurance, resting heart rate, of school level tribal boys. Tukey's HSD post-hoc test was applied to obtain the comparison between group means.

Level Of Significance

To find out the differential effects of the treatments using the analysis of co-variance, the level of significance was set at 0.05 level of confidence which was considered adequate and appropriate for purpose of the study.

Findings

The data were examined by applying analysis of covariance with regard to three experimental groups and one control group to find out the inter-group variability to allow for the comparison between initial and final scores and to effect adjustments in final or terminal scores which allowed for difference in same initial variables.

For each of the chosen variables, the results pertaining to significant difference, if any, between the pre-test and post-test means for the four groups after twelve weeks of training, which were submitted to analysis of covariance, are given below. In case of significant difference found than Tukey's HSD post hoc test was employed to find out the differences of paired groups means. The level of significance was set at 0.05 level of confidence.

Cardio Respiratory Endurance

Table 1: Analysis of Covariance of data on Cardio Respiratory Endurance between pre and post-test of Control group, Continuous running, Fartlek and Interval training group.

	Mean				Sum Of Square	Df	Mean Sum of Square	"F" Ratio
	Control Group	Continuous Group	Fartlek Group	Interval Group				
Pre Test	2311.52±22.39	2376.23±22.63	2366.01±20.43	2324.21±17.95	B 89023.958 W 1525115.833	3 116	B 29674.653 W 13147.550	2.257
Post Test	2292.36 ^a ±24.39	2390.56 ^b ±16.58	2388.83 ^b ±17.93	2359.04 ^{ab} ±14.13	B 189588.333 W 1209808.333	3 116	B 63196.111 W 10429.382	6.059**
Adjusted Post Test	2309.13 ^a ±15.76	2375.14 ^b ±15.75	2387.13 ^b ±15.67	2369.14 ^b ±15.66	B 94517.978 W 838996.944	3 115	B 31505.993 W 7295.626	4.318**

* Significant (p<0.05), ** Significant (p<0.01), N = 120, B = between group variance, W = within group variance, F₃(115) = 2.68, F₁(115) = 3.92

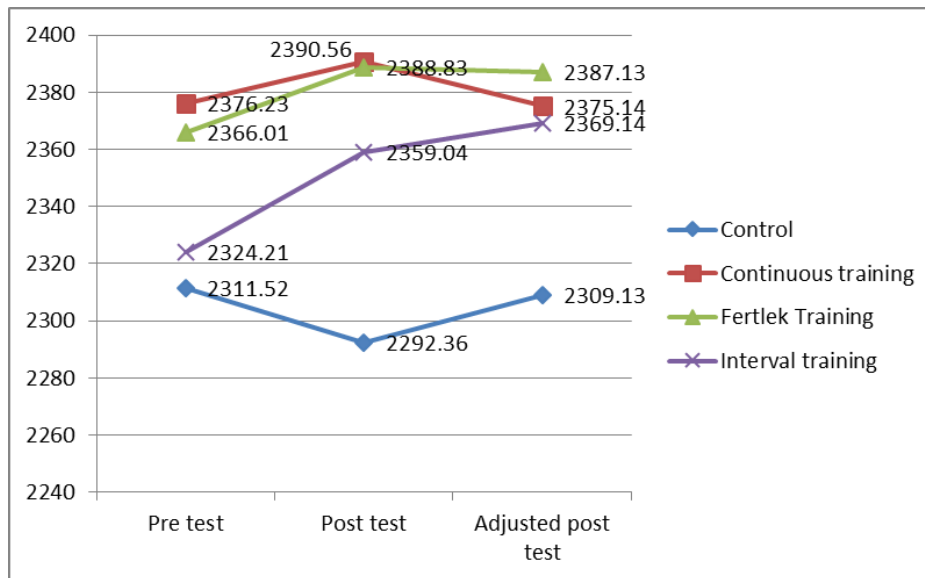


Fig 1: Pre-test, post-test and adjusted post-test means of control group and three experimental groups in cardio respiratory endurance.

The adjusted post-test mean values on Cardio respiratory endurance for control group, Continuous running group, Fartlek training group and Interval training group were 2309.13±15.76, 2375.14±15.75, 2387.13±15.67 and 2369.14±15.66 respectively. The obtained 'F' value of 4.318 for adjusted post test scores on cardio respiratory endurance, which was higher than the table value of 2.68 for significance

with df 3 and 116 at 0.05 level of confidence. The result of the study showed that there was significant difference among Control group, Continuous running group, Fartlek training group and Interval training group on Cardio respiratory endurance. Since the four groups were involved the Tukey's HSD post hoc test was applied to find out the paired mean differences if any, and it is presented in table II.

Table 2: Tukey's post hoc test for the differences between paired adjusted post test means of Cardio respiratory endurance.

Treatment Pair	Tukey HSD Q-statistics	Tukey HSD p - value	Tukey HSD infer fence
Control VS Continuous	5.2650	0.0017172	**p<0.01
Control VS Fartlek	5.1756	0.0021349	**p<0.01
Control VS Interval	3.5755	0.0608989	Insignificant
Continuous VS Fartlek	0.0894	0.8999947	Insignificant
Continuous VS Interval	1.6894	0.6162154	Insignificant
Fartlek VS Interval	1.6000	0.6514978	Insignificant

*Significant at 0.05 level of confidence, **Significant at 0.01 level of confidence

Discussion of Findings

The analysis of data with reference to pre and post-test mean values revealed that, after administration of continuous, fartlek and interval training for twelve weeks on tribal boys, cardio respiratory endurance was influenced by the continuous, fartlek and interval training.

As per literature we know that cardio-respiratory endurance is the ability of our body to keep exercising for a long time without stopping. It is the body's ability to supply enough oxygen and other fuel to the muscles during long periods of activity. The heart, lungs, and blood vessels are the parts of the body that are involved in this process.

The findings of this study in consonance with the findings of -

Aljbour, Dr-Nayef (2016), who proved that continuous training program has a great effective contribution in developing the cardio respiratory endurance of the sample of the study. Dr. Nimeshkumar D. Chaudhari (2016) proved that there was a significant improvement on cardiorespiratory endurance due to Fartlek training. Ratheesh Babu. C, Dr. V. Vallimurugan (2003) had shown that eight weeks of interval training had significant influence on cardio respiratory endurance of football players.

Cardio respiratory endurance is influenced by the training. In this study under continuous and fartlek training, which are dynamic and interesting in nature. These training process gears up the higher load bearing capacity of the muscle, heart,

lungs and blood vessels, which are help a lot of improving the cardio respiratory endurance. Interval training also increased the calculated value to just near the significant value. So the result shown in this study the aerobic training programme

contributed towards developing cardio respiratory endurance of the tribal boys.

Resting Heart Rate

Table 3: Analysis of Covariance of data on Resting Heart Rate between pre and post-test of Control group, Continuous running, Fartlek and Interval training group.

	Mean				Sum Of Square	Df	Mean Sum of Square	"F" Ratio
	Control Group	Continuous Group	Fartlek Group	Interval Group				
Pre-Test	71.37±0.37	71.43±0.20	70.50±0.26	71.03±0.15	B 16.367 W 296.800	3 116	B 5.456 W 2.559	2.132
Post-Test	71.40 ^a ±0.35	70.37 ^{ab} ±0.25	69.47 ^b ±0.21	69.90 ^b ±0.21	B 62.033 W 240.333	3 116	B 20.678 W 2.072	9.980**
Adjusted Post-Test	71.24 ^a ±0.21	70.37 ^a ±0.25	70.17 ^a ±0.21	69.80 ^b ±0.21	B 37.904 W 145.314	3 115	B 12.635 W 1.264	9.999**

* Significant (p<0.05), ** Significant (p<0.01), N = 120, B = between group variance, W = within group variance, F₃ (115) = 2.68, F₁ (115) = 3.92

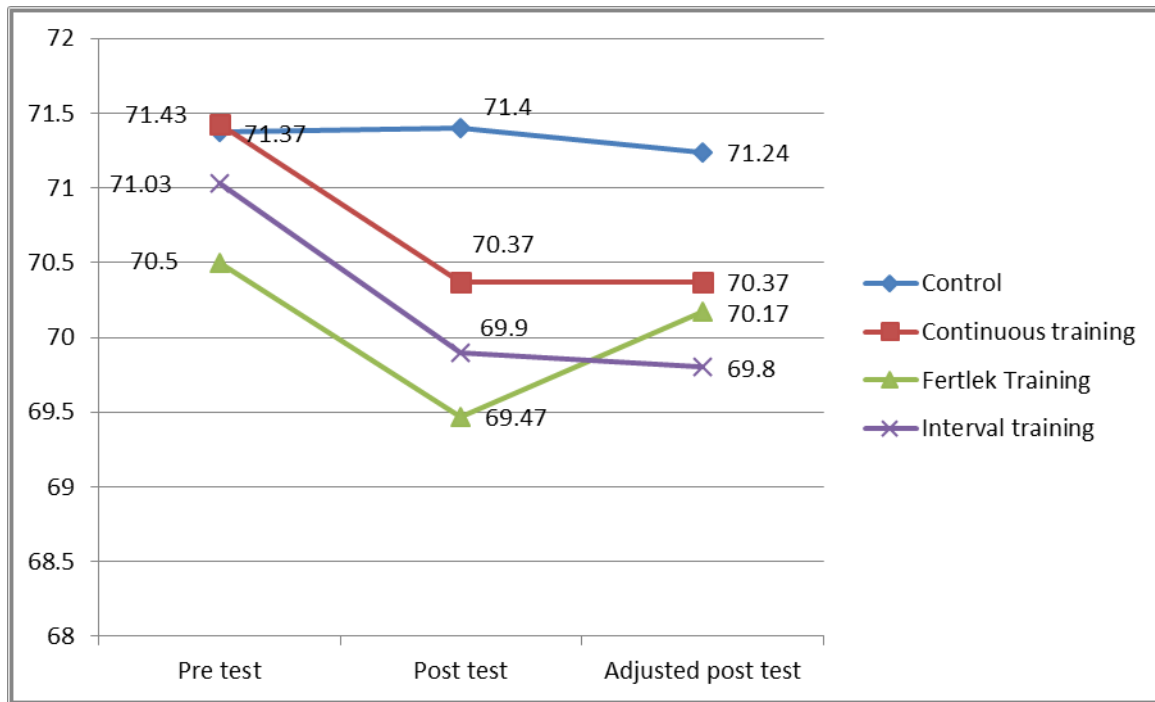


Fig 2: Pre-test, post-test and adjusted post-test means of control group and three experimental groups in resting heart rate.

The adjusted post-test mean values on resting heart rate for control group, Continuous running group, Fartlek training group and Interval training group were 71.24±0.21, 70.37±0.25, 70.17±0.21 and 69.80±0.21 respectively. The obtained 'F' value of 9.999 for adjusted post test scores on resting heart rate, which was higher than the table value of 2.68 for significance with df 3 and 116 at 0.05 level of

confidence.

The result of the study showed that there was significant difference among Control group, Continuous running group, Fartlek training group and Interval training group on resting heart rate. Since the four groups were involved the Tukey's post hoc test was applied to find out the paired mean differences if any, and it is presented in table IV.

Table 4: Tukey's post hoc test for the differences between paired adjusted post-test means of Resting Heart Rate.

Treatment Pair	Tukey HSD Q-statistics	Tukey HSD p - value	Tukey HSD infer fence
Control VS Continuous	3.9321	0.0317462	* p<0.05
Control VS Fartlek	7.3568	0.0010053	** p<0.01
Control VS Interval	5.7079	0.0010053	** p<0.01
Continuous VS Fartlek	3.4247	0.0787817	Insignificant
Continuous VS Interval	1.7758	0.5821295	Insignificant
Fartlek VS Interval	1.6489	0.6322004	Insignificant

*Significant at 0.05 level of confidence, **Significant at 0.01 level of confidence

Discussion of Findings

The analysis of data with reference to pre and post-test mean values revealed that, after administration of 12 weeks continuous, fartlek and interval training on tribal boys physiological variable resting heart rate was influenced by these specific training.

As per literature we learnt that resting heart rate, or pulse, is the number of times our heart beats per minute when we are at

rest – such as when we are relaxed, sitting or lying down. It varies from person to person. Knowledge from our daily life we found, if we've been moving around a lot, our heart rate will increase. It means physical activity influenced our heart rate. Also the fitness level, air temperature, emotions, medicines, age etc. influenced it.

The findings of this study corroborates with the findings of Oh, Deuk-Ja *et al.* (2016) who established that strenuous

training program has a great effective contribution in developing the resting heart rate of the sample of the study.

Yashoda Rani (2018) had shown that there was a significant improvement on resting pulse rate for fartlek training group when compared with the control group.

The more you exercise and the harder you train, the lower your resting heart rate, Welch says. That's why resting heart rate is often cited as a good measure of how fit a person is. RHR is lowered as the heart muscle becomes stronger and is able to pump out more blood per heartbeat. Selected training in this study continuous fartlek and interval training are active in nature. These training processes are effective on heart muscle, fitness level and also increased the capacity of heart. This study symbolized that definite aerobic training programme Strengthen the resting heart rate of the tribal boys.

Discussion of Hypothesis

Pertaining to the analysis of findings of the present study, the hypothesis formulated earlier that, It was hypothesized that there would be no significant differences due to application of three type of Aerobic training i.e., Continuous Running, Fartlek and Interval training for 12 weeks on physiological variables like cardio respiratory endurance and resting heart rate of school level tribal boys was rejected.

Conclusion

Cardio respiratory endurance was significantly improved by the Continuous running group and Fartlek training group, also an upbeat influenced had shown by Interval training group when all are compared with control group. Resting Heart rate was significantly improved by the Continuous running group, Fartlek running group and Interval training group when compared with control group.

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