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**Dr. Kunal Sardar**  
Assistant Teacher Napara High  
School (H.S.) Purulia,  
West Bengal India

## Effects of circuit training and aerobic fitness programme on physical fitness of secondary school girls

**Dr. Kunal Sardar**

### Abstract

The purpose of the study was to find out the effect of ten weeks physical training programme named by circuit training and aerobic fitness programme of school girls. The study was consisted to 9<sup>th</sup> and 10<sup>th</sup> grade school girls of Khirpai S.K.B.M. Girls' High School, District-Paschim Medinipur, West Bengal, India and their age was ranged between 13<sup>th</sup> to 15<sup>th</sup> years. Thereafter subjects were subdivided randomly into three equal groups consisting of 30 subjects in each group. Two experimental designs, i.e., circuit training and aerobic fitness programmes were randomly assigned to the two groups, named by experimental groups (aerobic fitness group, circuit training group), while the remaining group was studied as control group. The composite scores of individual items of AAHPER Youth Fitness Test battery were studied as criterion measures. In order to investigate the comparative effect of each training method on physical fitness of the secondary school girls, the analysis of co-variance statistics was used. On the basis of analysis within the limitation imposed on the experimental conditions researchers came to the following conclusions that the circuit training programme is found to be more effective in developing physical fitness of secondary school girls than that of aerobic fitness programme.

**Keywords:** Circuit training, aerobic fitness, physical fitness

### Introduction

"We never appreciate health so much as when we lose it". Although it may be difficult to change the health habits of adults, schools and colleges can and should educate young people about their health and fitness. This is not only essential from the individual's point of view but also in view of this country's national posture.

Regular participation in vigorous exercise increases physical fitness. A high level of physical fitness is desirable for a full, productive life. Sedentary living habits and poor physical fitness have a negative impact on both health and daily living. (A.K Uppal) <sup>[1]</sup>

The development and maintenance of physical fitness can be brought about through a variety of exercise programme of which a person may adopt any one or more, depending upon the purpose, need, time and the facilities available.

Circuit training, aerobic dance, calisthenics etc. are some effective measure to develop physical fitness.

Circuit training can be designed to develop strength, power, muscular endurance, speed, agility and neuromuscular co-ordination, flexibility and cardiovascular endurance.

Aerobics and dance play a very important role in physical education, which helps to enhance all round development and elasticity in muscle and enable one to execute various movements with great co-ordination from one activity to another without any difficulty, which also in turn help to develop physical fitness of the individual (Charote) <sup>[2]</sup>.

Kirby <sup>[4]</sup> studied the effect of various exercise programmes involving different amount of exercise on the development of certain component of physical fitness. The Harvard step test and J.C.R test were administered to 140 college men before and after a 6-week training programme meeting three times a week. The five exercise programme consisted of class activity plus one isometric exercise, the same plus running in the place, the same plus vertical jumping. The same plus push-ups and entirely improved significantly on the Harvard step test with no differences between groups. The JCR composite score showed a significant negative linear regression with the number of exercises.

**Correspondence**  
**Dr. Kunal Sardar**  
Assistant Teacher Napara High  
School (H.S.) Purulia,  
West Bengal India

**Methods**

Ninety school girls of 9<sup>th</sup> and 10<sup>th</sup> grade of Khirpai Dr. S.K.B.M. Girls High School, Dist- Paschim Medinipur, West Bengal were selected as subjects for this study. Average age of the subjects was 14 years ranging from 13 years to 15 years of age. It was ensured from the health examination that all the subjects were medically fit for going through the experimental treatment of the study.

Ninety subjects were further sub-divided randomly into three equal groups consisting of 30 subjects in each group. Two experimental designs, i.e., circuit training and aerobic fitness programmes were randomly assigned to the two groups, named by experimental groups (aerobic fitness group, circuit training group), while the remaining group was studied as control group.

The composite scores of individual items of AAHPER Youth Fitness Test battery were studied as criterion measures.

To compare the effect of circuit training and aerobic fitness programme on physical fitness ability of secondary school girls, the random group design was adopted.

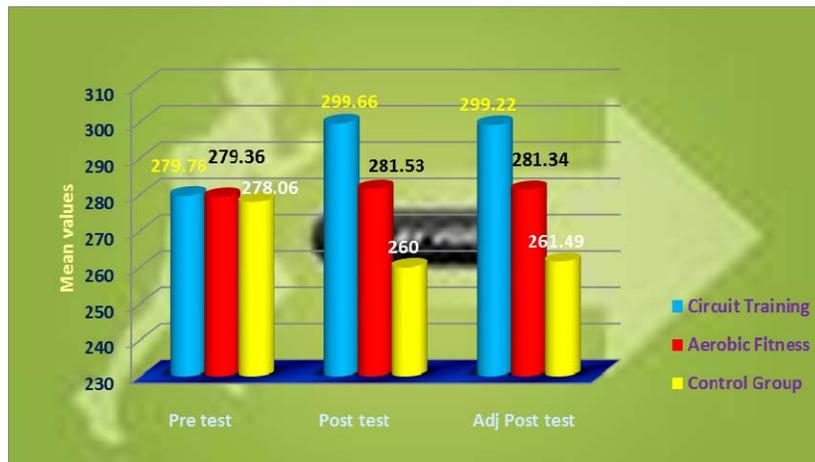
In order to investigate the comparative effect of each training method on physical fitness of the secondary school girls, the analysis of co-variance statistics was used. In case of significant difference by analysis of co-variance is noticed, the post-hoc test was used, in order to investigate the existence of significant difference, if any, between the paired adjusted final means. For testing the mean differences the level of significance was set at 0.05 level of confidence.

**Results and Discussion**

**Table 1:** Analysis of Co-Variance of the Means of Two Experimental Groups and the Control Group in Physical Fitness

Means	Circuit Training	Aerobic Fitness	Control Group	Sum of Square		df	Mean Sum of Square	F-Ratio
				A	47.20	2	23.70	
Pre Test	279.76	279.36	278.06	W	2256.20	87	25.93	0.914
				A	22613.68	2	11306.84	
Post Test	299.66	281.53	260.00	W	137355.6	87	1578.80	7.16*
				A	20968.44	2	10484.22	
Adj. Post Test	299.22	281.34	261.49	W	13469.33	86	1586.86	6.607*

\*Significant at 0.05 level F.05 (2, 87) =3.10 F.05 (2, 86) =3.10.  
A = among mean variance. W = within group variance



**Fig 1:** Comparison of Physical Fitness among Circuit Training, Aerobic Fitness and Control group in pre, post and adjusted posttest means.

Table 1 and Figure 1 clearly indicate no significant difference in physical fitness among circuit training, aerobic fitness and control group subjects in pretest phase. Such insignificant difference indicates that the random assignment of the group were quite successful. However, the ‘F’ ration values of the post and adjusted posttest phases reveal significant difference in physical fitness among circuit training, aerobic fitness and control group subjects. The ‘F’ values in post and adjusted posttest phases (F = 7.16 and 6.607 respectively) are found to be greater than that of required ‘F’ ratio value 3.10 to be significant at 0.05 level of confidence.

Table 1 and figure 1 clearly indicate no significant difference in physical fitness among circuit training, aerobic fitness and control group subjects in pretest phase. It is also noticed that physical fitness means values especially in circuit training and

aerobic fitness and also in control group remain almost the same. Such insignificant difference and almost uniform mean values in pretest phase clearly indicate that the random assignment of the groups were quite successful.

Further significant difference in physical fitness among circuit training, aerobic fitness and control group subjects in post and adjusted posttest phases are noticed. It is also observed that the mean values of the experimental group i.e., the circuit training and aerobic fitness groups have been significantly improved from pre to post test phase. Whereas, such improvement in physical fitness means of control group subjects from pre to post test phase are not noticed. From such results it may be assumed that the circuit training and aerobic fitness programme are having significant effect in improving physical fitness ability of the secondary school girls. Further it

is specifically noticed that the rate of improvement in mean value in physical fitness of the circuit training group is found to be higher than that of aerobic fitness group which indicate the greater effect of circuit training programme in development physical fitness ability of secondary school girls than that of aerobic fitness programme.

Brown <sup>[3]</sup> conducted the study on the effect of circuit training on the physical fitness on grade 5 girls. Two classes were tested on the AAHPER youth fitness test before and after eight weeks of regular physical education classes. The experimental class, chosen by chance, had a supplemental 10 minute circuit training programme before each class. Both classes showed significant gains in total score. The experimental group showed significant gains on all the tests except the 50 yard dash. The control group showed significant gains on all tests except the pull ups (modified) and 50 yard dash. The mean difference between groups was not significant, but the experimental class made greater gains except in the shuttle run. The supplemental circuit training produced generally better but not significantly better result than the regular programme.

Socrates <sup>[4]</sup> carried out a study on the comparison of three training programmes and their effects on five physical components. Grade eleven boys in physical education were measured in flexibility, agility, speed, muscle power and endurance of the legs (1 minute squat jump) before and after eight weeks participation in isometric weight training on regular physical education programme. The following conclusions were based on significant 't' ratio. Weight training was found to be superior to regular physical education programme for improving muscle power and endurance of arms and legs, isometric training was superior to the other programme for improving muscle power and endurance of the arms.

### **Conclusions**

Both the circuit training and the aerobic fitness programme are found to be effective in developing physical fitness of secondary school girls. It is specifically noticed that the circuit training programme is found to be more effective in developing physical fitness of secondary school girls than that of aerobic fitness programme.

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