Effect of Circuit and Interval Training on Selected Physical and Physiological Variables among Badminton Players

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Abstract

The purpose of the study was to find out the effect of circuit and interval training on selected physical and physiological variables among badminton players. To achieve the purpose of this study, 45 badminton players, were selected from different colleges in Chennai. The selected subject's age groups were ranging from 18 to 25. The subjects were randomly divided into three groups and each group consists of fifteen subjects. Group one acted as experimental group I and Group II acted as experimental group II and group three acted as control group. Group three underwent their routine work, group one underwent circuit training exercises, group two underwent interval training and group three underwent control group for a period of six weeks. The physical fitness and physiological variables such as strength and cardiovascular endurance were selected as criterion variables. The test items to appraise the criterion variables Strength (Pushups) Counts, Cardiovascular endurance (12 min run and walk test) Meters were selected as test items. All the subjects of three groups were tested on criterion variables at prior to and immediately after the training programme. Pretest and post test scores were collected from the subjects, which formed post test scores. The differences between the means of initial and final scores were the effect of circuit training and interval training on badminton players. The obtained data were statistically treated using (ANCOVA) was used to find out the significant difference. If the obtained 'F'ratio was significant, Scheffe's test was applied as a post hoc to determine the paired means difference. In all the case level of confidence was fixed at 0.05 to test the significance. The results of the study proved that there was significant improvement on strength and cardiovascular endurance due to the both training interventions. The circuit and interval training group experienced a significantly greater gain in strength and cardiovascular endurance than the control group. Further, the result shows that there was significant difference between the groups in physical fitness among Badminton Players.

Keywords: Strength, Cardiovascular endurance, Interval training and Circuit training.

Introduction

Badminton is one of the most popular sports in Asia with more than 200 mill 100 players worldwide. **(Chin et al, 1995).** However, the beneficial effect of recreational badminton activities on health and performance is not well known. In contrast, a number of studies have recently shown recreational soccer to have a major impact on bone- muscle- and cardiovascular health, most likely due to

the intermittent and intense nature of soccer **(Kr ustru, et al, 2010).** In addition, the rate of perceived exertion is lower during soccer compared to jogging and interval running, despite similar relative heart rates. Interestingly, the activity profile of badminton is similar to that of soccer, with repeated high-intensity actions **(Cabello Manrique, et al, 2003 & Faude et al 2007).** Thus, it could be of interest to investigate the longitudinal effects of recreational badminton on performance and health, especially as no studies has previously done this. Thus, the aim of the present study was to investigate a newly developed Danish Badminton Fitness concept (B-FIT) on health and performance among Danish high school students, some recreationally active but none were involved in regular badminton activities.

Physical fitness is now a day considered as one of the most important health markers in childhood **(Ortega et al., 2008).** Consequently, in the last decades several countries have been promoting physical fitness improvement among young people in different ways **(Department of Health and Human Services, 1990).** In many circumstances, schools have been considered the best setting in which children with low fitness levels can be identified and a healthy lifestyle can be promoted **(Ortega et al., 2008).** Therefore, one of the main Spanish government strategies was focused on modifying school legislations in orderto give health a more important role in the Educational System **(Ministeriode Educacion Ciencia, 2006).** Schools are mainly attempting to increase the pupils' health level by using measures such as the improvement of their physical fitness through physical education (PE) **(Ministeriode Educacion Ciencia, 2006).** It has been concluded that the health promotion policies and physical activity programs should be designed to improve physical fitness, where strength and cardiovascular endurance are the most important health-related physical fitness components **(Ortega et al., 2008).**

It is known that planning long-term fitness programs is the best way to improve these components **(Donnelly, et al., 2009).** None the less, in the PE setting these programs cannot last the whole course or a large part of it since many curricular contents must be developed in a school year **(Ministeriode Educacion Ciencia, 2006).** Consequently, in the PE setting we need to find short-term programs that could be also effective for the increment of fitness. One of the methodologies that meet these criteria could be the circuit training **(Dorgo et al., 2009; Granacheret al., 2011a; Granacher et al., 2011b).** The circuit training effectively reduces the time devoted to while allowing an adequate training volume to be achieved **(Alcaraz Ramón et al., 2008).** Moreover, it permits a greater motor engagement time **(Lozano et al., 2009),** which is a very important requirement for the success of a PE program.

Methods

The purpose of the study was to find out the effect of circuit training and interval training on selected physical and physiological variables among badminton players. To achieve the purpose of this study, 45 badminton players, were selected from different colleges in Chennai. The selected subject's age groups were ranging from 18 to 25. The subjects were randomly divided into three groups and each group consists of fifteen subjects. Group I acted as experimental group I and Group II acted as experimental group II and group III acted as control group. Group III underwent their routine work group I underwent circuit training exercises group II underwent interval training for a period of six weeks. Pre test and post test scores were collected from the subjects, which formed post test scores. The differences between the means of initial and final scores were the effect of circuit training and interval training on badminton players. The obtained data were statistically treated using ANCOVA. Group one underwent circuit training group II underwent interval training for a period of six weeks.

Results on Strength

The statistical analysis comparing the initial and final means is presented in Table I.

Table-I
Computation of Analysis of Covariance on Strength
(Total Scores in counts)

	Circuit Training Group	Interval Training Group	Control Group	SV	SS	df	MS	Obtained F
Pre Test Mean	24	25	24	B	3.2	2	1.60	0.56
				W	77.1	42	2.86	
Post Test Mean	28	28	25	B	69.1	2	34.53	7.74*
				W	120.4	42	4.46	
Adjusted Post Test Mean	29	28	25	B	71.6	2	35.79	9.48*
				W	98.2	41	3.78	
Mean Diff	4	3	1					

Table F-ratio at 0.05 level of confidence for 2 and 41 (df) =3.22, *Significant at 0.05 level.

As shown in Table I, the obtained F value on the scores of pre test means 0.56 was lesser then the required F value, which proved that the random assignment of the subjects were successful and their scores in strength before the training were equal and there was no significant differences.

The obtained F value on post test means was 7.74, which was greater than the required table F value of 3.22 the study was significant.

Taking into consideration of the pre test and post test means adjusted post test means were determined and analysis of covariance was done and the obtained F value 9.48 was greater than the required value of 3.22 and hence it was accepted that there was significant differences among the treated groups.

Since significant differences were recorded, the results were subjected to post hoc analysis using Scheffe's Confidence Interval test. The results were presented in Table II.

Table-II

Scheffe's Confidence Interval Test Scores on Strength

Means				Required C I
Circuit Training Group	Interval Training Group	Control group	Mean Difference	
29	28		1	2.18
29		25	**4***	2.18
	28	25	**3***	2.18

*Significant at 0.05 level

The post hoc analysis of obtained ordered adjusted means proved that there was significant differences existed between circuit training and control group. Further there was significant differences existed between interval training and control group. However there was no significant difference between circuit training and interval training on strength.

Results on Cardio Vascular Endurance

The statistical analysis comparing the initial and final means of endurance is presented in Table III.

Table-III
Computation of Analysis of Covariance on Cardiovascular Endurance (Total Scores in Meters)

	Circuit Training Group	Interval Training Group	Control Group	SV	SS	df	MS	Obtained F
Pre Test Mean	2107.5	2115.0	2112.0	B	285.0	2	142.5	0.01
				W	401272.5	42	14861.9	
Post Test Mean	2267.0	2280.0	2129.0	B	140046.7	2	70023.3	4.78*
				W	395300.0	42	14640.7	
Adjusted Post Test Mean	2270.5	2277.0	2128.6	B	140664.6	2	70332.3	19.04*
				W	96018.5	41	3693.0	
Mean Diff	159.5	165.0	17.0					

Table F-ratio at 0.05 level of confidence for 2 and 41 (df) =3.22, *Significant at 0.05 level.

As shown in Table III, the obtained F value on the scores of pre test means 0.01 was lesser then the required F value, which proved that the random assignment of the subjects were successful and their scores in cardiovascular endurance before the training were equal and there was no significant differences.

The obtained F value on post test means was 4.78, which was greater than the required table F value of 3.22. Hence, the study was significant.

Taking into consideration of the pre test means and post test means adjusted post test means were determined and analysis of covariance was done and the obtained F value 19.04 was greater than the required value of 3.22 and hence it was accepted that there was significant differences among the treated groups.

Since significant differences were recorded, the results were subjected to post hoc analysis using Scheffe's Confidence Interval test. The results were presented in Table IV.

Table-IV

Scheffe's Confidence Interval Test Scores on Cardiovascular Endurance

Means				Required C I
Circuit Training Group	Interval Training Group	Control Group	Mean Difference	
2270.45	2276.98		6.52	68.32
2270.45		2128.57	141.89*	68.32
	2276.98	2128.57	148.41*	68.32

*Significant at 0.05 level

The post hoc analysis of obtained ordered adjusted means proved that there was significant differences existed between circuit training and control group. Further, there was significant differences existed between interval training and control group. However there was no significant difference between circuit training and interval training on cardiovascular endurance.

Conclusions

1. It was concluded that there was significant improvement on strength due to six weeks of circuit training and interval training compared with control group.
2. It was concluded that there was significant improvement on cardio vascular endurance due to six weeks of circuit training and interval training compared with control group.
3. It was also concluded that then was no significant differences between the Treatment groups.

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