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## Effect of circuit training on selected physiological components among women kho-kho players

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### Abstract

The aim of the study was to find out the effect of circuit training on selected physiological components among women Kho-kho players. To achieve the purpose of the study thirty women Kho-kho players were selected from various departments of Bharathidasan University, Tiruchirappalli. The selected subjects age range between 21 to 23 years. The selected subjects randomly divided in to two equal groups, group I experimental group, group II control group. Each group consists of 15 subjects. Experimental Group I undergone to circuit training for 6 weeks, 6 days per week under training in the morning sessions only. Group II control group does not have any specific training other than the regular routine activities. The physiological variables such as resting pulse rate, breath holding time,  $VO_2$  max have been selected and pre and post test data has collected for analysis. The collected data were statistically analyzed by analysis of covariance (ANCOVA). The level of significance was fixed at 0.05 of confidence for all the cases. The experimental groups had significant improvement on all the selected physiological components when comparing to the control group.

**Keywords:** Circuit training, resting pulse rate, breath holding time and  $VO_2$  max

### Introduction

Kho-kho is one of the most popular traditional sports in India. This is the sport which is played by men, women and even children in almost every school and colleges. Like all Indian games, it is simple, inexpensive and enjoyable – that make the game as enduring as it is endearing. It is essentially a version of tag that's why children like this sport to play during their break time. One of the main points of a successful animal life is "Active Chase" Which is a fundamental principal of the Indian Game called kho-kho, synonymous with the phrase a "Game of Chase". It will not be mistake to say that kho-kho was a recognized sport in the ancient times even earlier to the oldest mythological writing of classic Maharashtra. The game of chase was then also regarded as legend, as it used in phraseology as putting kho to someone as active chase meaning putting as effective block and stopping the progress. The current adaption of the game was actually an adaption about the time of World War I in 1914, but at the same time lacked exacting rules and regulation that govern the games in the modern times. There were neither any dimension to the playground nor the poles, which demarcate the centre line, and the factor was also missing <sup>[1]</sup>.

### Circuit Training

Circuit training was invented in 1953 as effective and efficient way for coaches to train many athletes in a limited amount of time with limited equipment. The exerciser moved through a series of weight training or calisthenics arranged consequently. It was past paced workout of 15 to 45 seconds per station with little (15-30 seconds) rest or no rest between stations. Today this is known as "circuit weight training" research has shown that it can increase muscular strength and endurance. There is mild improvement in aerobic stamina but only if the rest periods are kept very short. Another variation is "aerobic circuit training" aerobic station like treadmill, rower or stepper (1 to 5 minute per station) or interspersed with weight training stations. This protocol has been found to increase aerobic stamina and muscular endurance and endurance <sup>[2]</sup>.

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## Methodology

The purpose of the study was to find out the effect of circuit training on selected physiological components among women Kho-kho players. To achieve the purpose of the study thirty women Kho-kho players were selected from various Departments of Bharathidasan University, Tiruchirappalli. The selected subjects age range between 21 to 23 years. The selected subjects randomly divided in to two equal groups, group I named as experimental group, group II as control group. Each group consists of 15 subjects. Experimental Group I undergone to circuit training for 6 weeks, 6 days per week under training in the morning secessions only. Group II

Control Group does not have any specific training other than the regular routine activities. The following physiological components such as resting pulse rate, breathe holding time and  $VO_2$  max and have been selected.

**Table 1:** Criterion Variables and Tests

S.No.	Criterion Variables	Test Items	Unit of Measurements
1	Resting Pulse Rate	Stethoscope	In score in bpm
2	Breath Holding Time	Nose-clip method	In seconds
3	$VO_2$ Max	Bench test	In ml/min/kg

**Table 2:** Computation of Analysis of Covariance of Resting Pulse Rate on Experimental and Control Group among women Kho-Kho Players

Test	Experimental Group	Control Group	Sources of Variables	Sum of Square	DF	Mean Square	'F'-Ratio
Pre Test	74.93	76.73	Between	24.300	1	24.300	2.52
			Within	269.867	28	9.638	
Post Test	66.73	75.87	Between	625.633	1	625.633	96.96*
			Within	180.667	28	6.452	
Adjusted Post Test	67.11	75.49	Between	483.748	1	483.748	97.46*
			Within	134.018	27	4.964	

\*Significant at 0.05 level, Table value with df 2 and 28 and 2 and 27 were 3.34 and 3.35

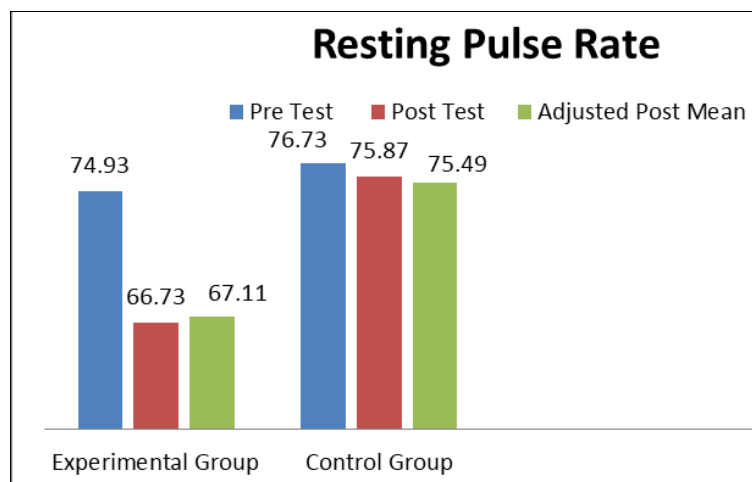
Table 2 shows that the pre-test mean values of resting pulse rate on experimental groups and control group were 74.93 and 76.73. The obtained F value 2.52 which was lesser then the table value of 3.34. Hence it was proved that the randomization of the subjects was successful.

The post-test mean values of resting pulse rate on experimental groups and control group were 66.73 and 75.87. The obtained F value 96.96 which was greater than the table value of 3.34. Hence it was proved that there was a significant

improvement among kho-kho players.

The adjusted post-test mean values of resting pulse rate on experimental groups and control group were 67.11 and 75.49. The obtained F value 97.46 which was greater than the table value of 3.22. Hence it was proved that there was a significant improvement on resting pulse rate among women kho-kho players.

For the better understanding of the results mean values of resting pulse rate were graphically presented in the figure 1.



**Fig 1:** The Graphical Representation of The Pre, Post and Adjusted Mean Values of Resting Pulse Rate on Experimental and Control Groups.

**Table 3:** Computation of Analysis of Covariance of Breath Holding Time on Experimental and Control Group among women Kho-Kho Players

Test	Experimental Group	Control Group	Sources of Variables	Sum of Square	DF	Mean Square	'F'-Ratio
Pre-Test	39.53	37.53	Between	24.300	1	24.300	2.53
			Within	269.067	28	9.610	
Post-Test	44.13	37.00	Between	381.633	1	381.633	40.21*
			Within	265.733	28	9.490	
Adjusted	43.33	37.80	Between	210.021	1	210.021	111.05*
			Within	51.065	27	1.891	

\*Significant at 0.05 level, Table value with DF 2 and 28 and 2 and 27 were 3.34 and 3.35

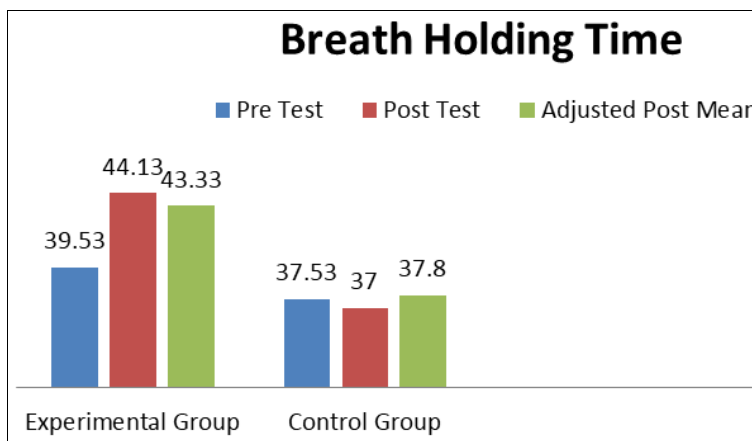
Table 3 shows that the pre-test mean values of breath holding time on experimental groups and control group were 39.53 and 37.53. The obtained F value 2.53 which was lesser then the table value of 3.34. Hence it was proved that the

randomization of the subjects was successful.

The post-test mean values of breath holding time on experimental groups and control group were 44.13 and 37.00. The obtained F value 40.21 which was greater than the table

value of 3.34. Hence it was proved that there was a significant improvement on breath holding time among kho-kho players. The adjusted post-test mean values of breath holding time on experimental groups and control group were 43.33 and 37.80. The obtained F value 111.05 which was greater than the table

value of 3.22. Hence it was proved that there was a significant improvement on breath holding time among women kho-kho players. For the better understanding of the results mean values of breath holding time were graphically presented in the figure 2



**Fig 2:** The Graphical Representation of the Pre, Post and Adjusted Mean Values of Breath Holding Time on Experimental and Control Groups.

**Table 4:** Computation of Analysis of Covariance of Vo<sub>2</sub> Max Experimental and Control Group among Women Kho-Kho Players

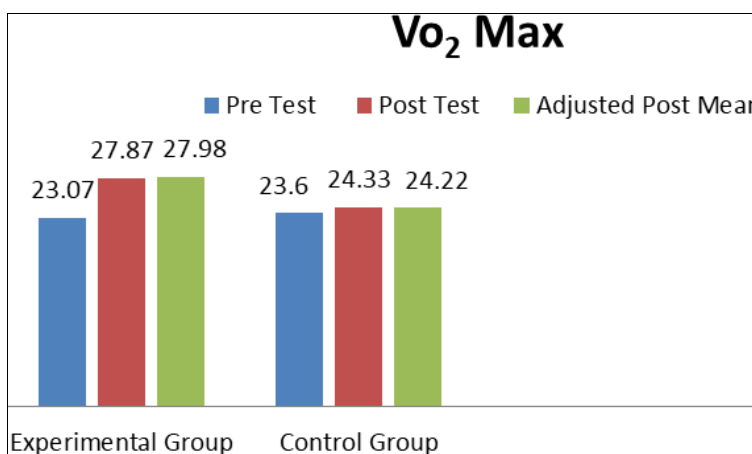
Test	Experimental Group	Control Group	Sources of Variables	Sum of Square	DF	Mean Square	'F'-Ratio
Pre Test	23.07	23.60	Between	2.133	1	2.133	0.85
			Within	70.533	28	2.519	
Post Test	27.87	24.33	Between	93.633	1	93.633	44.39*
			Within	59.067	28	2.110	
Adjusted Post Test	27.98	24.22	Between	102.570	1	102.570	58.88*
			Within	47.033	27	1.742	

\*Significant at 0.05 level, Table value with df 2 and 28 and 2 and 27 were 3.34 and 3.35

Table 4 shows that the pre-test mean values of Vo<sub>2</sub> max on experimental groups and control group were 23.07 and 23.60. The obtained F value was 0.85 which was lesser then the table value of 3.34. Hence it was proved that the randomization of the subjects was successful.

The post-test mean values of Vo<sub>2</sub> max on experimental groups and control group were 27.87 and 24.33. The obtained F value was 44.39 which was greater than the table value of 3.34. Hence it was proved that there was a significant improvement

on Vo<sub>2</sub> max among kho-kho players. The adjusted post-test mean values of Vo<sub>2</sub> max on experimental groups and control group were 27.98 and 24.22 and the obtained F value was 58.88 which was greater than the table value of 3.22. Hence it was proved that there was a significant improvement on Vo<sub>2</sub> max among women kho-kho players. For the better understanding of the results mean values of Vo<sub>2</sub> max were graphically presented in the figure 3.



**Fig 3:** The Graphical Representation of the Pre, Post And Adjusted Mean Values of Vo<sub>2</sub> Max on Experimental and Control Groups.

**Results and Discussions**

The results of the study reveals that the significant improvement in all the selected physiological components such as resting pulse rate, breath holding time, Vo<sub>2</sub> max among women kho-kho players due to six weeks of circuit

training. The results of the studies are in line with the studies of [3] and [4].

**Conclusions**

1. It was concluded that six weeks of circuit training

produced significant improvement on resting pulse rate, breath holding time,  $Vo_2$  max among women kho-kho players.

2. The experimental group was significantly improved the selected physiological components such as resting pulse rate, breath holding time and  $Vo_2$  max among women kho-kho players while comparing to the control group.
3. The Control group don't shown any specific improvement on the selected physiological components.

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