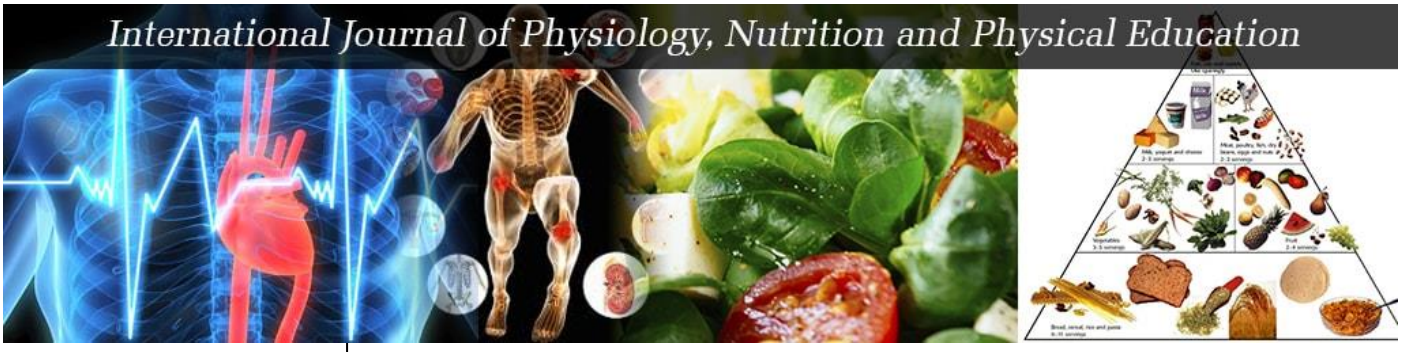

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Effect of circuit training on selected variables of lung capacities of school's Basketball players in Rajasthan

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Abstract
The purpose of the present study was to effect of circuit training for developing vital capacity and peak flow rate among Basketball players at various Private and Govt. school of Rajasthan. 30 students between the age group of 15 to 17years were selected for the study. The six weeks circuit training program for basketball group was conducted in order to study the effect of circuit training on vital capacity and pea flow rate of subjects. The Pre Test and Post Test were proficient through dry spirometer and pea flow meter to estimation the effects of circuit training on vital capacity and peak flow rate respectively of school students. A specialized circuit training program was applied to the subjects during the PE classes which was on alternate days under the supervision of a researcher. Training program includes 5 stations .i.e. (Burpee Jump, on the spot jog, surya namaskar, sit ups and squat thrusts). Participants needs to perform two 60 sec on each station and 4 set on each station with a break of 2 mins in between set and 15 sec break in between change of station. results shows no significant difference between pre test post test vital capacity value of subjects as the sig (2-tailed) value is (0.62) which is greater than 0.05 level of significance, results also depicts t-value as (0.01) for variable Peak flow rate which is less than 0.05 level of significance.

Keywords: Circuit training, Basketball players, Rajasthan

Introduction
Physical fitness is nowadays 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). Lung capacities are the best reflectors of aerobic capacities in human so selected lung capacities tests were included in the study to analyze the lung capacities of school going children's. 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). 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). Basketball players of various Schools these days are suffering through several common sedentary life styles related diseases so it draws researcher's attention towards area of study.

Objectives of the Study
1. The objective of the study is to find out the effect of eight week Circuit training on vital capacity and Peak Flow Rate among Basketball players studying in various school of Rajasthan.

Hypothesis
1. It was hypothesized that there would be significant difference in pre test and post test findings due to the effect of circuit training programme for Vital Capacity.
2. It was hypothesized that there would be significant difference in pre test and post test findings due to the effect of circuit training programme for peak flow rate.

Methodology

The participants were evaluated using the dry spirometer for vital capacity and peak flow meter for peak flow rate. The test sessions were carried out during the PE classes at the beginning and at the end of the specific circuit training program (pre-test and post-test), a pre-test was conducted and in order to see the changes that were produced. Subsequently, after a period of detraining and the application of the maintenance circuit training program, the participants were evaluated again (retest).

The tests were administered in an indoor sports centre court with a non-slip floor, under the same environmental conditions, on the same day and at the same time for each student. A blind evaluation was carried out by two researchers following the standard protocol for each test. Each researcher assessed lung capacity with the same tests using identical equipment. Prior to the evaluation, the participants were in complete resting state.

Peak flow meter: A peak flow meter is a portable, easy-to-use device that measures how well your lungs are able to expel air. By blowing hard through a mouthpiece on one end, the peak flow meter can measure the force of air in liters per minute and give you a reading on a built-in numbered scale.

A spirometer is an apparatus for measuring the volume of air inspired and expired by the lungs. A spirometer measures ventilation, the movement of air into and out of the lungs. The dry spirometer will identify two different types of abnormal ventilation patterns, obstructive and restrictive. There are various types of spirometers which use a number of different methods for measurement (pressure transducers, ultrasonic, water gauge).

Each participant was allowed to perform the test thrice and average of three performances was recorded as score. Performance was recorded last till 100 ml for each variable.

Pre-test and post test data was analyzed with help of Independent T-Test for all the variables on SPSS software.

Procedures

A specialized circuit training program was applied to the subjects during the PE classes which was on alternate days under the supervision of a researcher. Training program includes 5 stations i.e (Burphy Jump, on the spot jog, surya namaskar, sit ups and squat thrusts). Participants needs to perform two 60 sec on each station and 4 set on each station with a break of 2 mins in between set and 15 sec break in between change of station. Firstly, the participants performed a development circuit training program thrice a week on non-consecutive days for eight weeks. They completed a total of 20 training sessions, since two classes coincided with festivals and could not be used. Then, after a period of detraining (four weeks) the participants completed a maintenance circuit training program two sessions per week during four weeks. During the period of maintenance program, each session of maintenance was alternated with a normal class of PE according to the course planning designed by the teacher.

Each session lasted 40 minutes and consisted of a five-minute warm up during which children had to play a racing game, 40-minute circuit training, and two series of a 15–30 second cool-down of static stretching, primarily for the hamstrings and lumbar region. All exercises were fully explained and previously demonstrated by the researcher, and children were asked to try them during a few minutes before starting the first session of the intervention. According to previous studies carried out in the PE setting (Dorgo *et al*., 2009; Granacher *et al*., 2011a; Granacher *et al*., 2011b), the training was organized in a circuit program. One circuit of eight stations was developed, and then repeated twice in each session. Each station consisted of an exercise lasting from 15 to 35 seconds (extended progressively from the first session to the last), and the rest time between them was of 45-25 seconds (gradually reduced during the program). The increase of the work time and the decrease of the rest time along the intervention were based on the training load progression principle.

Findings

Table 1: Group Statistics

	Test	N	Mean	Std. Deviation	Std. Error Mean
Vital Capacity	pre	30	3.40	.857	.156
	post	30	3.80	.796	.145
Peak flow	pre	30	3.27	41.31	7.54
	post	30	3.55	44.20	8.07

Table-1 provides useful descriptive statistics for the pre-test and post test data that we compared, including the mean and standard deviation. Table -1 shows mean value for pre-test of vital capacity 3.40 and standard deviation 0.85, whereas post-test shows changes in mean value 3.80 and standard deviation 0.79 respectively. Table-1 also depicts mean value for pre-test peak flow rate 3.27 and standard deviation 4
1.31, whereas post-test values were recorded as 3.55 and 44.20 respectively.

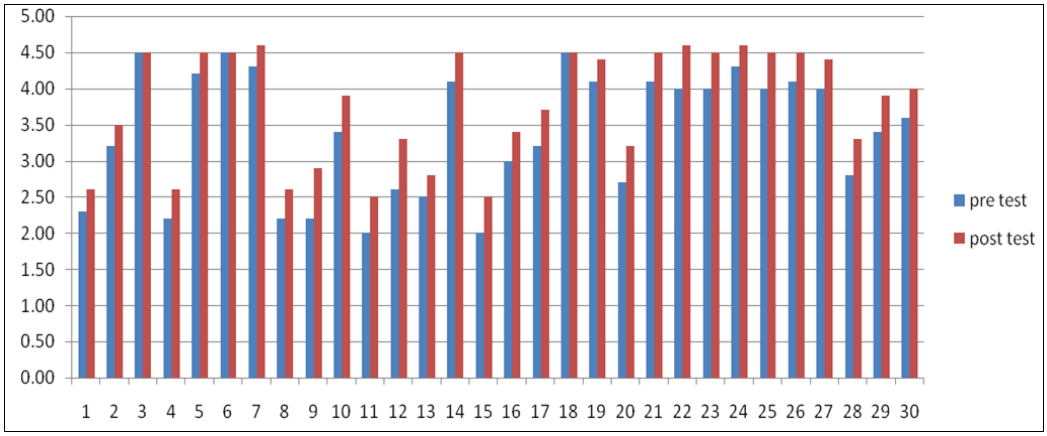

Fig 1: Vital Capacity

For better understanding of recorded values of data descriptive values for variable Vital Capacity of subjects are shown in figure-1 for pre-test and post-test.

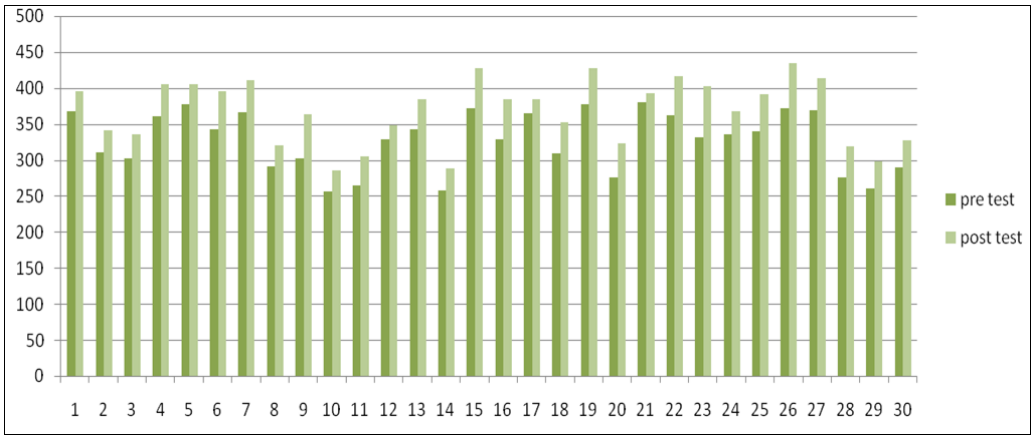

Fig 2: Peak Flow rate

For better understanding of recorded values of data descriptive values for variable Peak Flow rate of subjects are shown in figure-1 for pre-test and post-test.

Table 2: Independent Samples Test

Levene's Test for Equality of Variances				t-test for Equality of Means				
		F	Sig.	t	DF	Sig. (2-tailed)	Mean Difference	Std. Error Difference
Vital Capacity	Equal variances assumed	.255	.616	-1.90	58	.062	-.406	.21361
	Equal variances not assumed			-1.90	57.68	.062	-.406	.21361
Peak flow	Equal variances assumed	.294	.590	-2.61	58	.011	-28.866	11.04700
	Equal variances not assumed			-2.61	57.73	.011	-28.866	11.04700

*Sig at 0.05 level of significance

Table-2 Shows the Independent sample T-Test. Table -2 shows no significant difference between pre-test, post-test vital capacity value of subjects as the sig (2-tailed) value is (0.62) which is greater than 0.05 level of significance, table-2 also depicts t-value as (0.01) for variable Peak flow rate which is less than 0.05 level of significance hence it may be concluded that significant difference are there in respect to variable peak flow rate. This result clearly discards the hypothesis formed at the beginning of study that there will be significant differences in pre-test and post test data as a result of eight week circuit training in respect of variable Vital capacity as t-value shows no significant differences. But results also shows significant differences in respect to the variable Peak Flow rate which accepts the second hypothesis that there will be significant differences in pre-test and post test data of peak flow rate due to effect of eight week circuit training.

Summary Conclusion and recommendation

Study shows significant differences for the variable Peak Flow Rate. Significant changes shown for the variable peak flow rate is due to adaptive changes of training as subjects were not undergoing any other training programme other than specific circuit training programme. Study shows no significant changes for the variable Vital Capacity this may be because of physiological capacities of subjects which are subject to change along with the age. Vital capacity needs more of aerobic training for required improvements; specific circuit training programme may not provide optimum level of training load for improvement of variable vital capacity so this may also be one of the reasons due to which no significant differences were seen.

It is recommended to conduct study further with different stations in circuit training programme; training period may also be increased to obtain significant differences.

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