

## COMPARATIVE STUDY OF THE VITAL CAPACITY OF BASKETBALL PLAYERS AT DIFFERENT ALTITUDE

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### ABSTRACT

*The purpose of the study was to compare the vital capacity of basketball players at different altitude. To achieve the purpose of the study 10 male basketball players from Sadul Sports School, Bikaner (242 m from sea level) and 10 male from Gurukul senior secondary school, Dharmasala (1500 m from sea level) were selected. To measure the vital capacity dry spirometer were used. To test the significance of the mean difference between players of high altitude and low altitude independent t test was applied. The results showed that the basketball players of higher altitude (5.01 &  $\pm$ .334) demonstrated the better vital capacity.*

**Key Words:** Vital capacity, Players and Attitude.

### INTRODUCTION:

Effect of high altitude on performance has been mentioned that performance may actually be improved at high altitude in certain type of activity that are of short duration because of reduced air resistance. The reason for the sprint activities are powered largely by anabolic metabolism and hence are not greatly affected by the reduction in oxygen availability. Aerobic power (max oxygen uptake) is on the other hand reduced at high altitude. This means that intensity of the work that can be performed in a steady state (such as distance running events) is re-metabolism at a lower level of exertion. In Mexico City Olympics, there was either improvement or no impairment about 3% in the 800 meter run and 10% in 5000 and 10000 meter events. It is also observed that the time required for recovery after was much greater in Mexico-city than at sea

level. Exercises of strength are like sprint activities powered largely by anaerobic metabolism and are therefore not appreciably affected by high altitude.<sup>1</sup>

Research studies have explored the idea of taking advantage of the body's physiological changes at high altitude as a "natural blood doping" effect. As the blood increases its red cell volume in response to a lower availability of oxygen, VO<sub>2</sub> max also increases. Sea level performance has been shown to improve as a result.<sup>2</sup>

The existing literature in the field of basketball shows that endurance, speed, agility, maximum leg strength, upper body strength, leg power, muscular endurance, flexibility, coordination and reaction time are important, pre requisites for efficient basketball performance whereas excess body fat prove to be hindrance.<sup>3</sup>

#### METHODOLOGY:

Selection of subjects: For the purpose of the study 10 male students from Sadul Sports School, Bikaner and 10 male students from Gurukul senior secondary school, Dharamsala were selected as subjects for the study. According to the records their age ranged between 15 to 19 years.

The subjects were randomly selected from both the teams and all the subjects participated at the various levels of basketball competitions and the subjects had regular practice as per the schedule of their teams.

Selection of variables: For the purpose of the study vital capacity was selected.

Statistical technique: In order to compare the vital capacity the Independent t test with the use of the SPSS statistical software package, version 20.0 (IBM SPSS Statistics) was used. The level of significance was set at 0.05.

<sup>1</sup> S.S. Roy, **Sports and Environment** (Delhi: Surjeet Publication, 1994), p.64.

<sup>2</sup> **Journal of Applied Physiology**, 1997, Vol. 83, No. 1, pp. 102-112

<sup>3</sup> S.S. Roy, **Sports and Environment** (Delhi: Surjeet Publication, 1994), p.65.

**RESULTS:**

Results pertaining to vital capacity at different altitude are presented below in the following tables:-

Table 1

DESCRIPTIVE STATISTICS OF VITAL CAPACITY				
	Different Altitudes	N	Mean	Std. Deviation
Vital Capacity	Low	10	4.4500	.40893
	High	10	5.0100	.33483

- Table 1 shows the values of mean and standard deviation for vital capacity at low altitude were  $4.45 \pm 0.41$  and at high altitude was  $5.01 \pm 0.33$ .

Table 2

Independent Samples Test for vital capacity							
		Levene's Test for Equality of Variances		t-test for Equality of Means			
		F	p-value	t	df	Sig. (2-tailed)	Mean Difference
Vital Capacity	Equal variances assumed	1.029	.324	-3.351	18	.004	-.56000
	Equal variances not assumed			-3.351	17.326	.004	-.56000

- In the table 2 Levene's test for equality of variance was used which depicts that the F – value was 1.029 which was not significant as the p-value was 0.324 which was not less than 0.05.

- From the table 2; it can also be seen that the value of t- statistics was -3.351. This t- value was significant as the p- value was .004 which was less than 0.05. Thus, the null hypothesis of equality of means of two groups may be rejected at 5% level of significance.

## DISCUSSION AND CONCLUSIONS:

The purpose of the study was to compare the vital capacity between basketball players from different altitudes. The result of the study shows that both the physiological variables namely vital capacity and peak flow rate showed significant difference.

High altitude basketball players showed higher scores of vital capacity than that of lower altitude basketball players. Wolf et al. (1997) conducted a study in which he found that altitude difference could be a variable which influencing these measurements. These results may be attributed to the fact that people residing at high altitudes has a significant larger chest circumferences and thorax dimensions which are likely a consequence of population (genetic) differences in the response to hypoxia during growth.

It was concluded that the basketball players of higher altitude had significantly higher vital capacity than lower altitude basketball players.

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