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Comparative study of the selected physiological variables of footballers at different altitude

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Abstract
The purpose of this study was to compare the peal expiratory flow rate and vital capacity of football players at different altitude. To achieve the purpose of the study 10 male football players from Lakshmibai National Institute of Physical Education, Gwalior (M.P) (196 m from sea level) and 10 male football players from Garhwal Rifle, Lansdowne, Uttarakhand (1700 m from sea level) were selected. To measure the peak expiratory flow rate peak flow meter and for 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 used. The results revealed that the footballers of higher altitude (551 & $\pm$59.33) and (5.01 & $\pm$.334) demonstrated the better peak expiratory flow rate and vital capacity respectively.

Keywords: Peak expiratory flow rate, vital capacity

1. 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 that at sea level. Exercises of strength are like sprint activities powered largely by anaerobic metabolism and are therefore not appreciably affected by high altitude [1].

Soccer is played in highly varied environmental circumstances. In some instances the climatic conditions are too hostile or are temporarily unsuitable for playing and there is a dull in the competitive programme. This applies in northern climates in winter and in tropical countries during the rainy seasons. In the former it becomes impossible to maintain playing pitches and the weather is too cold to play in comfort. At another extreme is the stress imposed by a not environment and difficulty to copying with high heat and humidity. Usually the hottest part of the day is avoided and matches are timed for evening kick offs. In highly competitive international tournaments they do not compete in conditions to which they are unaccustomed.

Altitude constitutes another environmental variable that can make supra-normal demands on football teams. This has applied to those teams who have completed at the two world cup finals in Mexico in 1970 and 1986. Also it applied to teams playing friendly or international qualifying matches at moderate altitude. Additionally training camps for top teams are sometimes located at altitude resorts and this constitutes a particular novel challenge to sea level dwellers.

The existing literature in the field of soccer 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 soccer performance whereas excess body fat prove to be hindrance [2].

[1] S.S. Roy, Sports and Environment (Delhi: Surjeet Publication, 1994), p.64.
[2] S.S. Roy, Sports and Environment (Delhi: Surjeet Publication, 1994), p.65-66

1.1 Objectives: The objective of the study was the comparison of selected physiological variables of footballers of different altitude

2. Methodology

2.1 Selection of subjects: For the purpose of the study 10 male football players from Lakshmibai National Institute of Physical Education, Gwalior (M.P) and 10 male football players from Garhwal Rifle, Lansdowne, Uttarakhand were selected as subjects for this study. According to the records their age ranged between 18 to 26 years.

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

2.2 Selection of variables: For the purpose of the study peak expiratory flow rate and vital capacity were selected.

2.3 Statistical technique: In order to compare the peak expiratory flow rate and 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.

3. Results

Results pertaining to peak expiratory flow rate and vital capacity at different altitude are presented below in the following tables:

Table 1(a)

Descriptive Statistics Of Vital Capacity				
	different altitudes	N	Mean	Std. Deviation
Vital Capacity	Low	10	4.4500	.40893
	High	10	5.0100	.33483

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

Table 1(b)

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 1(b) levene's test for equality of variance was used which depicts that the F –value was 1.029 which was insignificant as the p-value was .324 which was more than 0.05.
- It can also be seen from the table 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.

Table 2(a)

Descriptive Statistics Of Peak Expiratory Flow Rate				
	different altitudes	N	Mean	Std. Deviation
Peak flow rate	Low	10	490.0000	40.55175
	High	10	551.0000	59.33895

- Table 2(a) reveals that the values of mean and standard deviation for peak flow rate at low altitude were 4.90.00 $\pm$ 40.55 and at moderate altitude was 551.00 $\pm$ 59.34.

Table 2(b)

Independent Samples Test for peak flow rate							
		Levene's Test for Equality of Variances		t-test for Equality of Means			
		F	p-value	T	df	Sig. (2-tailed)	Mean Difference
Peak flow rate	Equal variances assumed	1.689	.210	-2.684	18	.015	-61.00000
	Equal variances not assumed			-2.684	15.901	.016	-61.00000

- In the table 4(b) levene's test for equality of variance was used which depicts that the F –value was 1.689 which was insignificant as the p-value was .210 which was more than 0.05.
- It can be seen from the table that the value of t- statistics was -2.68. This t- value was significant as the p- value was 0.015 which was less than 0.05. Thus, the null hypothesis of equality of means of two groups may be rejected.

4. Discussion and Conclusions

The purpose of the study was to compare the selected physiological variable between footballers of different altitudes. The result of the study reveals that the both the physiological variables namely vital capacity and peak flow rate showed significant difference.

- High altitude football players demonstrated higher scores of vital capacity and peak flow rate than that of lower altitude football players. Wolf et al. (1997) conducted a study in which he found that altitude difference could be a variable which influencing spirometric 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 football players of higher altitude had a significantly better peak expiratory flow rate as well as vital capacity than those of lower altitude football players.

5. References

1. Astrand PO, Åstrand I. Heart rate during muscular work in man exposed to prolonged hypoxia. Journal of applied physiology. 1958; 13(1):75-80.
2. Aughey RJ, Hammond K, Varley MC, Schmidt WF, Bourdon PC, Buchheit M, Gore CJ. Soccer activity profile of altitude versus sea-level natives during acclimatisation to 3600 m (ISA3600). British journal of sports medicine. 2013; 47(1):107-113.
3. Basu CK, Banerjee PK, Selvamurthy W, Sarybaev A, Mirrakhimov MM. Acclimatization to high altitude in the Tien Shan: a comparative study of Indians and Kyrgyzis. Wilderness & environmental medicine. 2007; 18(2):106-110.
4. Beidleman BA, Muza SR, Rock PB, Fulco CS, Lyons TP, Hoyt RW, *et al.* Exercise responses after altitude acclimatization are retained during reintroduction to altitude. Medicine and science in sports and exercise. 1997; 29(12):1588-1595.