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## ANALYSIS OF PHYSIOLOGICAL VARIABLE AMONG SCHOOL STUDENTS AT DIFFERENT ALTITUDES IN TAMIL NADU

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**Abstract:-**The purpose of this study was to analyse the physiological variable among school students at different altitudes in Tamil Nadu. Forty five (n = 45) high school boys players of different sports were selected as subjects from different regions such as coastal, plain and high altitude at random. The age group of the subjects ranged between 14 and 18 years. Breath holding time was selected as the criterion variable and that was measured by using electronic stop watch. The collected data was statistically analysed by using analysis of variance (ANOVA) and Scheffe's test was applied as a post hoc test to determine the significant differences between the mean. The result of the study showed that there was a significant difference ( $p < 0.05$ ) in breath holding time between the coast and high altitude and plain and high altitude. Results also showed that, the coastal and plain altitude players are better in breath holding time than high altitude players.

**Keywords:** Coastal area, high altitude, male players, breath holding time.

### INTRODUCTION

Altitude is a distance measurement, usually in the vertical or "up" direction, between a reference datum and a point or object. It is commonly used to mean the height above sea level of a location in geography. The people live in the hills may change when compare the people live in coastal and plain (Fleishman, 1963). Tamil Nadu is one of the Southern State of India; having different geographical region such as coastal, plain and altitude. In that different area people are survived and their lifestyle also changes according to their environment. People who live in coastal regions may suffer the cumulative burden of environmental stress from the activities on and overcrowding of the coast and from upstream and inland development (Baracco et al., 2007). Altitude acclimatization consists of a number of reversible physiological adaptations. These enable the body to cope with low oxygen levels. In the early stage of acclimatization, breathing and heart rate increases. Long term adaptations include the production of more red blood cells, an increase in the hemoglobin content of the blood, and a greater blood supply to muscles. All these adaptations help to improve the ability of the blood to carry oxygen to respiring tissues. Acclimatization to medium altitudes (1829 m above sea level) takes about two weeks, but for high altitudes (more than 3048 m above sea level) may take much longer.

Breath holding time is defined as the duration of time through which one can hold his/ her breath without inhaling or exhaling after a deep inhalation. The volume of air inspired and expired per unit of time is tightly controlled, both with respect to the frequency of breaths and to tidal volume (Hazeidine, 1985). Breathing is regulated so the lungs can maintain the Pao<sub>2</sub> and Paco<sub>2</sub> within normal range, even under widely varying conditions such as exercise (www.buzzle.com, 2011). Breath holding ability depends on various factors like motivation, practice, fatigue etc. The circulatory and respiratory systems affect breath holding capacity. Improvement in breath holding time could be achieved through practice and it may be possible for some individual to hold their breath until they become unconscious (Robert, 1972). Hence the investigator made an attempt to analyse the physiological variable such as breath holding time of male students at different altitudes.

**METHODOLOGY**

Forty five (n = 45) male high school players of different sports such as football (n = 15), handball (n = 8), volleyball (n = 6) and cricket (n = 16) were selected as subjects for this study from different regions such as coastal, plain and high altitude at random. Fifteen players (n = 15) were selected from each region and their age ranged between 14 and 18 years. Breath holding time was selected as the criterion variable and that was measured by using electronic stop watch. The obtained data from the variable were statistically analysed with one-way analysis of variance (ANOVA). Whenever the F ratio was found to be significant, Scheffe's test was applied as a post hoc test to determine the mean differences. The level of confidence was set to priority at 0.05 levels.

**RESULTS AND DISCUSSION**

**Table – I**  
**Analysis of Variance of the Coastal, Plain and High Altitude of Breath Holding Time**

Mean			SOV	Sum of Squares	df	Mean Squares	F Ratio
Coastal	Plain	High Altitude					
47.6	43.6	34.13	Between	1434.84	2	717.42	31.03*
			Within	970.93	42	23.12	

\* Significant  $F = (2, 42) (0.05) = 3.22, p < 0.05$

From the table-I, the mean values of the breath holding time of coastal, plain and high altitude are 47.6, 43.6 and 34.13 seconds respectively. The obtained F ratio of 31.03 is greater than the table value of 3.22 required for significant at 0.05 level of confidence.

The results of the study indicate that there is a significant difference between the mean of coastal, plain and high altitude atmosphere on breath holding time. To determine which of the mean had a significant difference, Scheffe's test was applied as a post-hoc test and the results are presented in table-II.

**Table – II**  
**Scheffe's Test for the Difference between the Mean of Coastal, Plain and High Altitude of Breath Holding Time**

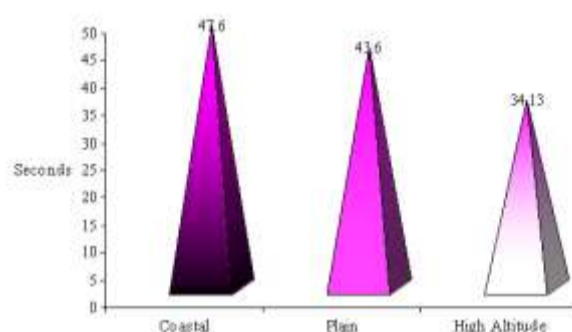
Mean			Mean Difference	Confidence Interval (C.I)
Coastal	Plain	High Altitude		
47.6	43.6		4.0	4.45
47.6		34.13	13.47*	
	43.6	34.13	9.47*	

\* Significant,  $p < 0.05$

Table-II shows the mean difference in breath holding time between the coastal and high altitude and plain and high altitude are 13.47 and 9.47 respectively. These values are higher than the required confidence interval value 4.45, which shows significant difference at the 0.05 level of confidence. However the mean difference in breath holding time between coastal and plain atmosphere is 4.0. This value is lesser than the confidence interval value of 4.45, which shows there was no significant difference at 0.05 levels.

The breath holding time depends on many factors like circulatory and respiratory system, motivation, practice, fatigue etc. (Monotoge, 1995). Different altitude life style and characters play a role to maintain physiological fitness especially the breath holding capacity of teenage boys' students. Lifestyle and behaviors are established during these years, which may influence adult behavior and health status (Ortega et al., 2008). The physiological development and health related fitness are the most important aspect to be understood thoroughly by every physical education and sports professionals. The outcome of physical literacy is as important to children's education development as numeric and literacy. Positive features distinguishing physical education, and the role of

initial training and professional development in preparing a life (Alfred et al., 2003). The result of the study indicated that the coastal and plain area boys' players were better in breath holding time than high altitude area boys' players. The mean values of breath holding time of different altitudes such as coastal, plain and high altitude are graphically presented in figure 1.



**Figure 1: The Mean Values of Breath Holding Time at different altitudes such as Coastal, Plain and High Altitude**

#### CONCLUSION

Any practical application requires careful implementation and individual experimentation. High altitude acclimatization consists of a number of reversible physiological adaptations. These enable the body to cope with low oxygen level. This study we can see the variable; breath holding time at different altitude such as a coastal area, plain area and high altitude area. The result of the study concluded that there was a significant difference between the breath holding time of coastal and high altitude atmosphere and plain and high altitude atmosphere. However there was no significant difference between coastal and plain areas of breath holding time performance. So that from the result we can say the coastal and plain area are the best atmospheres to improve breath holding time for school boys' students.

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