

Geographical Influences on Selected Physiological Variables among Boys at Adolescent's Level

S. Jeyaganesh^{1*} Dr. P. Manjupushpa²

¹ Ph.D. Research Scholar, Department of Physical Education, Bharathiar University, Coimbatore, Tamilnadu, India

² Assistant Professor, Department of Physical Education, Bharathiar University, Coimbatore, Tamilnadu, India

Abstract – *Geographical influences is associated with the sports performance in major sports. This study was to analysis the influences of physiological variables on the adolescent's boys by selecting the samples from the different areas like coastal, hills and plain .This study will recruit 30 adolescents boys, from each area randomly who are indigenous inhabitant. Their age group ranged from 17 to 19 years .Physiological parameters like oxygen consumption, pulse rate and Vo₂max was measured using the standard test. Descriptive statistics and F ratio was applied to analysis the significance among the groups. The results shows that there are significant difference among the three different areas on the selected variables*

Keywords: *Geographical Area, Oxygen Consumption, Pulse Rate, Vo₂ max.*

INTRODUCTION

Different environment living have difference in temperature life style, food habits, mode of transportation and nature of work, which will have its impact on the physical and physiological aspects. So human body tends to regulate to homeostatic functions according to the environment they are living. In the same way the different geographic atmosphere will have its variation according the gender and age. In this study different geographic areas like, coastal, hills and plain region was taken to find out that different in physiological variables due to the living atmosphere. Still there are different of opinion on this in different studies. When to captivating the coastal area, people in Tuticorin was chosen as subjects. This city is also called as port city and Pearl City and is exposed to hot and humid weather and receives adequate rainfall, in gender the city has very high humidity and soil is mostly loose and clay sandy. They are more exposed to humidity and high temperature most of time, this will lead to increase heart rate and by activating the sympathetic nervous system, and less stroke volume due to less venous return. And dehydration due to high temperature will decrease, stroke volume, cardiac output and blood pressure. Once there is a relative change in the cardiovascular parameters this will have its impact in the respiratory parameters too. Similarly, the hill area chosen for this study was Nilgiri hills, queen of hill is situated at an elevation of 900 to

2636 meters above Mediterranean Sea level. It has a pleasant chill weather throughout the year. It also keeps on changing in temperature from 4° c to 25° Celsius. In summer, days are hot and night are with pleasant coolness, winter will be chill and during monsoons it receives 121 cm of rain fall. The changes in weather will be accustomed to the inhabitant of Nilgiri people. This studies says that exposure to cold cause various physiological responses in human body. Cold exposure results in increased heart rate, systolic blood pressure, and they are associated with reduced vagal activation. When compared to the plain and coastal region living people. As for as plain region is concern Coimbatore was selected for the study. It is surrounded by the Western Ghats mountain range. The city has a hot semi-arid climate. The maximum temperature range from 35.9°C to the lowest of 12.2°C. It gets average annual rainfall of 600mm the city receives rainfall from the month of June to August due to south west monsoon winds and from September to November due to north east monsoon. It is wet –fertile land and rich in fauna and flora .So when associating to the hill area physiological parameters the coastal area living people tends to have greater. In wide-ranging the air we breathe depends on the atmospheric pressure, hills living people will have lesser in air pressure due to fact that the atmosphere is less dense and studies supports that people live in hill will have greater no of red blood cells. And they drift to develop acquired enlarged residual lung volume and its associated

increase in alveolar area when combined with the increased tissue capillarization and moderate increase in red blood cells and hemoglobin concentration contributes to the successful functional adaptation to the native hill living people⁽¹⁾. When generally stating, it is said that there will be high adaptation to the physiological responses to the indigenous inhabitants than the migrant people. But when comparing to the coastal region, these coastal people tends to have more of physiological responses. This study was to recognize the respiratory parameters among the adulthood, since this is the time for growth spurts and puberty changes both physically and physiologically. Physiological factor is one of the determinant factory for to excel in the sports performance and also to choose the suitable game according to their physical and physiological capacity.

Especially at the adolescent age, there will be a deistical change in the cardiorespiratory fitness, especially among boys⁽²⁾ in which increase in lean body mass, are observed following maturation of ventricular, arterial and lung functions improving cardio respiratory fitness. Therefore the study was to find the influence of the respiratory parameters among the geographical surface like hill, coastal and plain areas. So the results will help to find out the suitable game according to the respiratory fitness for the adolescence boys.

MEANS AND METHODS

For the present study total subjects ninety were selected with the geographical influences on physiological variables among boys at adolescents' level aged from 17-19 years were selected for this study. The study was analyzed into three groups. Group I was named as coastal area adolescent's boys. Group II was named as hills area adolescents' boys. Group -III was named plain area adolescent boys. The data were collected for coastal area, from Aditanar College of arts and science and Kamaraj College, Tuticorin district Tamilnadu, who were inhabitant of that place, for hill area Government Arts college, Ooty, and Government arts college, Gudalur, Nilgiri district, Tamilnadu and for plain area Rathinam College of Arts and Science and Sri Ramakrishna Mission Vidyalyaya Arts and Science College, Coimbatore district, Tamilnadu. The parameters selected for the study and the criterion measures used are oxygen consumption measured by pulse oximetry unit of measurement (mm Hg), pulse rate measured by pulse oximetry unit of measurement (Beats Per minute) and VO_2 max measured by Beep test, unit of measurement (ml/kg/min). After justifying the subjects the data were collected and scores were recorded.

STATISTICAL ANALYSIS AND RESULTS

The descriptive analysis of the data in terms of percentages of the dependent variables

(Geographical conditions) and independent (physiological parameters), there was obtained by measures of central tendency (average, median) and dispersion (standard deviation). F test was used to calculate to find out the difference existing among the three groups on the selected parameters.

DESCRIPTIVE STATISTICS ON PHYSIOLOGICAL VARIABLES

Variables	Geographical Areas	Mean	SD
OXYGEN CONSUMPTION	Coastal Area	98.36	1.90
	Hills Area	96.00	3.95
	Plain Area	97.13	1.33
PULSE RATE	Coastal Area	74.06	3.58
	Hills Area	74.96	3.15
	Plain Area	76.43	3.07
VO_2 MAX	Coastal Area	40.71	4.81
	Hills Area	37.10	2.81
	Plain Area	34.58	3.75

The above table indicates the descriptive statistics on physiological variables among the influences of Geographical areas on boys at adolescents level namely in Coastal, Hills and Plain areas. The mean and standard deviation of oxygen level was 98.36 ± 1.90 , 96.00 ± 3.95 and 97.13 ± 1.33 , Pulse rate were 74.06 ± 3.58 , 74.96 ± 3.15 , 76.43 ± 3.07 , VO_2 max are 40.71 ± 4.81 , 37.10 ± 2.81 and 34.58 ± 3.75 Coastal, Hill and Plain Area respectively on all the variables.

ONE WAY ANALYSIS OF VARIANCE ON PHYSIOLOGICAL VARIABLES

Variables	Source of variance	Sum of square	df	Mean square	F	Significance
Oxygen consumption	Between groups	84.06	2	42.03	3.98*	0.02
	Within groups	610.43	87	7.01		
	Total	694.50	89			
Pulse Rate	Between groups	85.62	2	42.81	5.99*	0.00
	Within groups	934.20	87	10.73		
	Total	1019.82	89			
VO_2 max	Between groups	568.87	2	284.43	18.87*	0.00
	Within groups	1311.32	87	15.07		
	Total	1880.20	89			

Level of significance 0.05 level

The obtained F-ratio for selected physiological variables are: 3.98 (Oxygen Consumption), 5.99(Pulse Rate) and 18.87(VO_2 max). Since the obtained value are higher than the required tabulated value (3.13) at 0.05 level of significance, it was found that mean difference between the adolescent's boys of coastal, hills and plain area was statistically significant in the physiological variables oxygenconsumption, pulse rate, and VO_2 max found to be statistically significant. From results it was observed that physiological variables coastal area adolescents' boys were found to be higher than hills and plain area.

DISCUSSION AND FINDINGS

The purpose of the study was to analyze the geographical based relation exists between the living atmosphere and respirator parameters, by selecting different areas like coastal, hills, plain. Naturally there exists a difference in high altitude, plain and sea level in atmospheric pressure, humidity, soil surface,

drinking water, crops grown etc. are the factors that vary from place to place and time to time and have its impact on biosphere and human environment. However, it's not easy to evaluate the exact impact of the different regions on the human body. But, due to certain scientific proven evidences, we can predict the factors that are responsible for the changes. In this study variables like oxygen consumption, pulse rate, $VO_2\text{max}$ were taken for the assessment among the three region and there was a significant difference on different regions. Oxygen consumption, pulse rate and $VO_2\text{max}$ have higher significance in the coastal region than the plain and hill region on all the variables. This is due the humidity of the sea level increase skin blood flow, which alters cardio vascular function. Widened core-to-skin temperature gradient would reduce the skin blood flow requirement at a given workload and potentially allow a greater percentage of any given of cardiac output to be directed to active skeletal muscle and thereby increase the vo_2 max.

Aerobic performance is influenced heavily by cardio vascular function. Hot environment increase skin, blood flow, which alters cardio vascular function. The elevated skin blood flow reduces the central blood volume and impairs muscle blood flow ⁽³⁾. When comparing to hill region with plain, they show better in pulse rate and VO_2 max, the studies supports that continuous life in the uplands appears to improve respiratory function. Because their aerobic enzymes are activated, their mitochondrial count will be more, their glycogen storage ability improves, capillary vessel density also increases, hemoglobin concentration also increases and the heart function are activated⁽⁴⁾ All the lead to the good respiratory function because of the environmental adaptation. Where else the oxygen consumption is better in plain region living people .This may be that hill region people having high oxygen, VO_2 max and they use the stored in oxygen for the functioning. Studies support that, when living at hill region the human body acclimatizes by increasing pulmonary perfusion and lung capacity, increasing the oxygen- binding capacity of blood and peripheral tissues, and increasing the amount of red blood cells in order to endure the low atmospheric pressure and low partial pressure of oxygen ⁽⁵⁾.

CONCLUSION

In this study the coastal living people are better in their pulmonary function when relating the plain and hill region. This study have to be further extended on other physiological functions and with different gender. During the period of transition from adolescence to adulthood, many structural, hormonal and biochemical changes to physiology take place with interfere with specific $VO_2\text{max}$ and aerobic fitness level which determine other physiological functions. Furthermore this study supports the physical educationist and coaches to select appropriate game

according to the physiological capacity and for further training process.

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Corresponding Author

S. Jeyaganesh*

Ph.D. Research Scholar, Department of Physical Education, Bharathiar University, Coimbatore, Tamilnadu, India