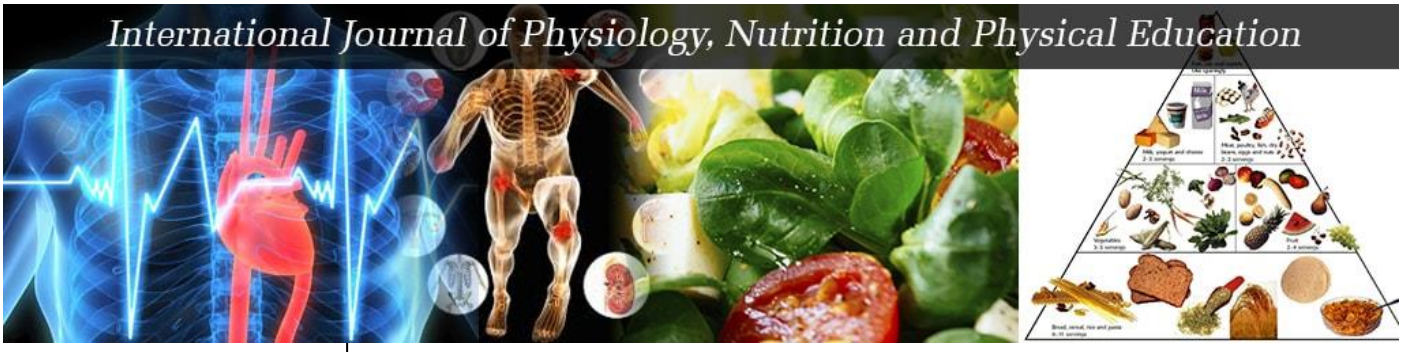

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Correlation of biochemical variables and long distance performance of cyclists

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Abstract
The purpose of the study was to find out the relationship of Biochemical variable of the performance of long distance cycling. Fifteen state level long distance Cyclists (men) were selected among the cyclist who participated in Tamilnadu state Cycling Championship. The age group of subjects ranged between 18-24 years. The Biochemical variables are (1) Total serum cholesterol (2) Serum Triglycerides (3) High density Lipo protein (4) Low density lipoprotein (5) Blood Hemoglobin (6) Red blood cells (7) White blood cells. The performance of long Distance cyclists were taken by conducted time trial in the presence of coach, for 80Km. road race. In case of the Biochemical variables, the subjects fasting blood samples Were collected and tested following standard techniques by Pathological experts. The descriptive statistics in terms of mean, standard deviation, range, standard error Skewness and Kurtosis were employed to present the data on selected Biochemical Variables of long distance cyclists. This study conclude that significant negative Correlation were obtained for (1) blood hemoglobin (2) red blood corpuscles to long Distance cycling performance. The correlation coefficients obtained for total cholesterol, Serum, triglycerides, High density lipoprotein cholesterol, low density lipoprotein Cholesterol and white blood corpuscles were -0.08,-0.30, 0.01, -0.01 and -0.23 Respectively, which were not statistically significant.

Keywords: Biochemical variables

1. Introduction
The sports performances are always interconnected and interlinked with many factors related to sports physiology, exercise physiology, biomechanics and anthropometric measurements. Sports performance area can be improved only through the co-ordinated functioning of allied branches mentioned above. In the above backgrounds those who work in this field should have thorough knowledge of these newly emerging branches of sports science.

Long distance cycling is considered to be a strenuous physical activity. This activity demands much preparation and training for successful participation in the event. These preparations include streamlining of eating habits, training schedules etc. The ultra endurance event of road cycling competition can be successfully conducted only if all these components are successfully managed.

Physiological differences between cycling and running are addressed: heart rate is different between the two activities both for maximal and sub-maximal intensities. The delta efficiency is higher in running. Ventilation is more impaired in cycling than in running. It has also been shown that pedaling cadence affects the metabolic responses during cycling (Zmuda, 2015) [6].

The endurance capacity can be increased only through increasing the aerobic capacity. Endurance training is a process involving several stages progressively. The length of the training programme depends upon the availability of time. The athletes are given basic endurance training in the first stage. The specific endurance can be started only after achieving the basic endurance. Only then can the athletes be brought up to the competitive participation level, to ensure better performance.

Running and cycling activity is performed by muscle contraction of the Introduction lower limbs. The main muscle group that are involved in cycling and running are the quadriceps and plantar flexors respectively. An exception to this is during uphill running when the recruitment of the quadriceps muscle is increased. Along with this remarkable physiological differences are also taken into account.

The aerobic capacity of the athletes is increased through regular exercise for a longer period. This is accomplished through the incremental difference in the heart size. It is through the regular exercise of the athlete that the heart muscles indirectly get exercised. The heart size is increased as a result of these exercises. The increase in heart size through endurance training is manifested in the increase of size of the left ventricle. Previously it was thought that the increased capacity of left ventricle is a hereditary factor. Now studies and research in this area has revealed that the increase in size of the left ventricle is largely due to the training and due to some hereditary factor, to some extent.

The relationship between exercise and blood lipid levels has been investigated extensively in recent years. Cross sectional studies find that, compared with non athletes, athletes generally have higher levels of HDL cholesterol, while levels of total and LDL cholesterol may be similar or some what lower. When body weight is maintained during an exercise programme modestly favorable changes in blood lipids are observed (i.e. decrease in total and LDL cholesterol and increase in HDL cholesterol). These changes are more pronounced when weight loss occurs during the exercise programme (Maston *et al*., 2013) [4].

2. Methodology

Fifteen long distance cyclists were selected for the present study and the long distance Cyclists were selected from the cyclists participated in Tamil Nadu state Cycling Championship (men). The age group ranged between 18-24 years. Biochemical Variables Fasting blood samples were drawn from the anticubitor veins of the subjects and the selected lipoprotein variables were analysed by enzymatic method following Wybenga and Pillegi"s method, blood hemoglobin by Cynmacthoglobin method and R.B.C and W.B.C following standard procedures. The data for the biochemical variables were obtained from the subjects' fasting blood samples were collected and tested following Standard techniques by Pathological experts.

2.1 Biochemical variables

1. Total serum cholesterol measured in mg/dl.
2. Serum triglycerides measured in mg./dl.
3. High density Lipoprotein measured in mg./dl.
4. Low density Lipoprotein measured in mg./dl.
5. Blood hemoglobin measured in M. mol./ litre
6. Red blood cells measured in millions per cubic millimeter blood
7. White blood cells measured in cubic millimeter of blood.

3. Statistical techniques

The descriptive statistics in terms of mean, standard deviation, standard error, were employed to present the data on selected biochemical variables of cyclists. The relationship of biochemical variable to the performance of long distance runners and cyclists were found out by using Pearson's product moment correlation. The level of significance employed was set at 0.05.

4. Results and Discussions

The data collected by adopting above procedure were statistically analyzed. The results are presented in the following table.

Table 1: Descriptive Statistics selected biochemical variables of state level cyclists

Variables	Mean	SD	SE
Total Cholesterol	192.53	32.75	8.46
Serum Triglyceride	101.2	10.34	2.66
High Density Lipoprotein Cholesterol	53.07	14.52	3.75
Low density Lipoprotein Cholesterol	123.87	33.92	8.76
Blood Hemoglobin	13.06	0.69	0.18
RBC	4.29	0.43	0.11
WBC	8240	169.18	437.9

Table 1 reveals that mean value and standard deviation of total cholesterol were 192.53, 32.75 respectively. Serum triglyceride mean and standard deviation value is 101.2 and 10.34 respectively. High density and low-density lipoprotein cholesterol mean and standard deviation values is 53.07, 14.52, 123.87 and 33.92 respectively. Blood hemoglobin, RBC and WBC mean and standard deviation values is 13.06, 4.29, 8240, 0.69, 0.43 and 169.18 respectively.

Table 2: Coefficient correlation of selected biochemical variables to long distance cycling performance

Sl No	Variables	Co efficient correlation
1	Total Cholesterol and cycling performance	-0.08
2	Serum Triglyceride and cycling performance	-0.30
3	High Density Lipoprotein Cholesterol and cycling performance	0.01
4	Low density Lipoprotein Cholesterol and cycling performance	-0.01
5	Blood Hemoglobin and cycling performance	-0.50
6	RBC corpuscles and cycling performance	-0.55
	WBC corpuscles and cycling performance	-0.23

*Significant at 0.05 level, r-value is 0.497

Table 2 reveals the coefficient of correlation of selected biochemical variable and cycling Performance of long distance cyclist. Significant negative correlation was observed between blood hemoglobin and cycling performance (-0.50*). Besides blood hemoglobin, significant negative correlation was observed between red blood corpuscles and cycling performance (-0.55). The correlation of coefficient obtained for total cholesterol, serum triglycerides, high density Lipoprotein cholesterol, low density lipoprotein cholesterol and white blood corpuscles were 0.08, -0.30, 0.01, -0.01 and -0.23 respectively which were not statistically significant.

5. Discussions

All forms of athletic training associated with the improvement of cardiac performance and changes in biochemistry. The exacts effects on these factors depend upon the type of training and the nature of activities involved. Long distance cycling improve the endurance capacity of the athletes, since these activities are prolonged and aerobic in nature.

The findings regarding biochemical variables to cycling performance, blood hemoglobin and red blood corpuscles were significantly related. The relationship of hemoglobin and red blood cells to performance of cycling is quite obvious since both hemoglobin and red blood corpuscles are

concerned with oxygen carrying capacity and the diffusion capacity of the cardio-respiratory functions. The study supported by the study conducted by (Hartung, 2012) [2].

6. Conclusions

Recognizing the limitation of the present study the following conclusions may be drawn.

1. There is significant negative relationship between blood hemoglobin and long distance cycling performance.
2. There is significant negative relationship between red blood corpuscles and long distance cycling performance.

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