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Comparison of haemoglobin and leukocyte between athletes and non athletes

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KEYWORDS

Haemoglobin;
Athletes;
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Analysis of variance

A B S T R A C T

The purpose of the study was to find out the comparison of haemoglobin and leukocytes between athletes and non athletes. To achieve this purpose of the study, twenty students were selected as subjects who were from the Department of Physical Education and Sports Sciences, Annamalai University, Annamalainagar. The selected subjects were aged between 21 to 25 years. Athletes are those who represented Annamalai University athletes for a minimum of four years and participated in the Inter university competition. Non athletes are those did not participate in Inter university competition. Both the groups underwent regular physical activities of Department of Physical Education and Sports Sciences. The following variables such as Haemoglobin and Leukocytes were selected. Static group comparison design was used in this study; static group consists of athletes and non athletes. There were no pre and post test, hence comparative design was used. Analysis of variance of independent group was applied and the level of significance was set at 0.05 level and the obtained 'F' ratio was tested for significance. There was a significant difference in leukocyte total count between athletes and non athletes, but there were no significant difference in haemoglobin between athletes and non athletes.

Introduction

Haemoglobin is the iron - containing oxygen-transport metalloprotein in the red blood cells of all vertebrates as well as the tissues of some invertebrates. Hemoglobin in the blood carries oxygen from the

respiratory organs to the rest of the body where it releases the oxygen to burn nutrients to provide energy to power the functions of the organism, and collects the resultant carbon dioxide to bring it back to

the respiratory organs to be dispensed from the organism. Hemoglobin is involved in the transport of other gases: it carries some of the body's respiratory carbon dioxide (about 10% of the total) as carbaminohemoglobin, in which CO₂ is bound to the globin protein. The molecule also carries the important regulatory molecule nitric oxide bound to a globin protein thiol group, releasing it at the same time as oxygen. Hemoglobin is also found outside red blood cells and their progenitor lines. Hemoglobin consists mostly of protein subunits (the "globin" molecules), and these proteins, in turn, are folded chains of a large number of different amino acids called polypeptides. The amino acid sequence of any polypeptide created by a cell is in turn determined by the stretches of DNA called genes. In all proteins, it is the amino acid sequence which determines the protein's chemical properties and function. There is more than one hemoglobin gene.

The amino acid sequences of the globin proteins in hemoglobins usually differ between species. These differences grow with evolutionary distance between species. For example, the most common hemoglobin sequences in humans and chimpanzees are nearly identical, differing by only one amino acid in both the alpha and the beta globin protein chains. These differences grow larger between less closely related species.

The use of performance enhancing drugs and techniques by the world's top athletes has been a persistent issue in world sporting events for nearly four decades, and in fact, dates all the way back to the Ancient Greeks who used mushrooms, ginseng root, and opium to enhance their athletic prowess. While some athletes choose not to participate in such practices,

others take advantage of the world's technological and medical advancements to gain a competitive edge. Artificial means of enhancing oxygen transport throughout the body include blood transfusions, specialized high-altitude training techniques, and newly engineered medical substances, and can enable athletes to take advantage of faster and less strenuous means of improving endurance and performance. While many athletic organizations prohibit blood doping, detecting the practice proves increasingly difficult as methods become more refined, obscuring what many consider to be an ethical boundary in sports.

White blood cells, or leukocytes are cells of the immune system involved in defending the body against both infectious disease and foreign materials. Five different and diverse types of leukocytes exist, but they are all produced and derived from a multipotent cell in the bone marrow known as a hematopoietic stem cell. They live for about three to four days in the average human body. Leukocytes are found throughout the body, including the blood and lymphatic system. The number of leukocytes in the blood is often an indicator of disease. There are normally approximately 7000 white blood cells per microliter of blood. They make up approximately 1% of the total blood volume in a healthy adult.

An increase in the number of leukocytes over the upper limits is called leukocytosis, and a decrease below the lower limit is called leukopenia. The physical properties of leukocytes, such as volume, conductivity, and granularity, may change due to activation, the presence of immature cells, or the presence of malignant leukocytes in leukemia, and may be reported as Cell Population Data.

Table.1 Analysis of variance for data on haemoglobin and leukocytes of athletes and non athletes

Particulars	Athletes Mean	Non Athletes Mean	Sum of squares	Df	Mean square	'F' ratio	(Normal) Average value
Haemoglobin	14.72	14.88	0.128	1	0.128	0.07	15gm/100ml of blood
			33.172	18	1.843		
Leukocyte	8.56	10.47	18.25	1	18.25	6.71*	7000
			48.90	18	2.72		

*Significance at 0.05 level.

Materials and Methods

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The following variables such as Haemoglobin and Leukocytes were selected. Static group comparison design was used in this study; static group consists of athletes and non athletes. There were no pre and post test, hence comparative design was used. Analysis of variance of independent group was applied and the level of significance was set at 0.05 level and the obtained 'F' ratio was tested for significance.

Result and Discussion

The mean and F ratio of haemoglobin and leukocytes on athletes and non athletes group are given in table.

The table shows insignificant difference in haemoglobin, and also shows the significant difference in leukocyte total count between athletes and non athletes.

The findings of the study showed that there was no significant difference between the athletes and non athletes on haemoglobin. The findings of the study showed that there was a significant difference between the athletes and non athletes on leukocytes. The results of the study have shown there was a significant difference among athletes and non athletes on leukocytes reference to the past studies on selected variable in accordance with Mayr, Schmidt and Robach.

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