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Comparative study of blood profile among sportsmen of different games

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Abstract

This paper deals with the analysis and comparison of lymphocytes in sportsmen of participating in yoga, basketball, volleyball. Thirty three sportsmen were taken as sample who are aged between 18 to 25 and represented Kurukshetra University in All India inter-university during the academic session 2017-18. To find out the difference in the mean concentration of lymphocytes, statistical techniques were employed. The result of the study shows that there exist a significant difference in the mean concentration of within and between all the three categories of sportsmen.

Keywords: lymphocytes, handball, volleyball, yoga players

1. Introduction

Sportsmen need somewhat more vitality and more power as compared to sedentary individual. This immunity helps the sportsmen not only to recover faster from the rigorous activity but also helps to tackle many diseases without much symptoms. In this context, white blood cells are the cells of the immune system that plays a significant role for the sportsmen.

White blood cells (WBCs) are the cells which helps our body to fight with foreign intruders and also for vasoconstriction. It was discovered by Gabriel Andral and William Addison in 1843 when they both concluded that the white blood cells were also passed from capillary vessels with red blood cells as the body's defenders against infection, white blood cells (WBC) contribute indirectly to performance by keeping athletes well enough (infection free) to maintain their training programmes. P L Horn *et al.* (2010).

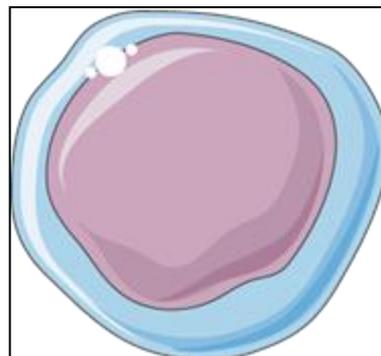


Fig: Normal Range is $4.2-9.7 \times 10^3$ cells/mcL. Shreelkha Sairam *et al.* (2013).

Lymphocytes

A lymphocyte is a type of white blood cell that is part of the immune system. There are two main types of lymphocytes: B cells and T cells. The B cells produce antibodies that are used to attack invading bacteria, viruses, and toxins. The T cells destroy the body's own cells that have themselves been taken over by viruses or become cancerous. National Cancer Institute Dictionary (2014).

Muñoz-Soria E *et al.* (2012) evaluated the effect of a treatment with glycoposphopeptide on Olympic high

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platform divers during training and competition by measuring lymphocytes and cortisol in peripheral blood, and secretory immunoglobulin A in saliva (sIg A). There was a 14-day treatment of capsules given to 2 groups of 8 divers 3 times per day. Measurements of the peripheral blood lymphocytes (TCD3+, TCD4+ and T CD8+), plasma cortisol and IgA levels in saliva were made on day 0, 21 and 150. The fact that there was a significant increase in S-IgA (9.89 ± 0.44 to 10.59 ± 0.55 , $P=0.001$) and B CD19+ (345.13 ± 108.24 to 484.75 ± 120.54 , $P=0.025$) in the Gp- and not in the placebo-treated group between the basal and first measurement was due to the variation among the athletes of the latter group, and not the increase itself, indicating that Gp acted as an immunomodulation. It was apparently the exercise and not the Gp treatment that caused the increase in S-IgA and B CD19+ at the 1st and 2nd measurements. They determined that sportspersons who practiced moderately intense workout, which stimulated the immune response, a Gp treatment of 2 weeks seems to have acted only as an immunomodulation that reduced the variation in the increased levels of IgA and B CD19+.

2. Methodology and Procedure Samples

In the present study, the purposive sampling sample method was used and 60 players were selected. To meet out the objectives of the study only those players were selected as samples, who had represented Kurukshetra University in All India Inter University Tournaments in their respective games. The age of sample ranges between 18 to 25 years. The categorization of subjects is as under:

Table 1: Categorization of subjects

Men		
Yoga	Handball	Volleyball
8	10	15
Total = 33		

Normal range

- Lymphocytes – LYM $0.8-5.0 \times 10^9/L$

3. Tools used

In this study, Hematological Analyzer was used as a tool to measure the mean concentration of various variables of subjects.

Hematological analyzer technology

Hematology analyzers are used widely in patient and research settings to count and characterize blood cells for disease detection and monitoring. Basic analyzers return a complete blood count (CBC) with a three-part differential white blood cell (WBC) count. Sophisticated analyzers measure cell morphology and can detect small cell populations to diagnose rare blood conditions.

The Horiba's Yumizen H500 is designed to give the concentration value of 27 parameters including full WBC. It uses the concept of Flow Cytometry and Cytochemistry. The DHSS (Double Hydrodynamic Sequential System) is used for above concepts.



Incubator

The incubators bundled with this analyzer are used to store blood samples of patients for monitoring. A special serum is to be mixed with blood which is present in these incubators that is essential to keep the blood analyzable for the duration of one hour.

4. Collection of data

The data collected from all the subjects took place during All India Inter University Training Camps for all the games subjects in session 2017-18. Proper permissions were taken from respective coaches regarding the sample collection. The blood samples were collected by a trained medical technician from Median Cubital Vein through venipuncture. The venipuncture site was sterilized first with antiseptic soaked cotton and tourniquet was applied near biceps branchi area of upper arm. A fresh IV syringe was used for each of the subject and waste syringes were disposed with utmost care afterwards.

5. Statistical techniques

The statistical tools are used to convert the quantitative data into qualitative responses, so that it may be easy to make the calculation and this process is known as quantification of data. The selection of statistical tools depends upon the nature of the data and number of variables included in the investigation. In order to analysis the data in the present study the following statistical techniques were used manually as well as on statistical software program SPSS 16 (Statistical Package for the Social Sciences):

a) Mean: Arithmetic mean was calculated by adding up all the Observations and dividing the sum by the number of individuals.

$$(\bar{X}) = \frac{\sum X}{N}$$

Where N = Total Number of subjects
 $\sum X$ = Sum of all individual values.

b) Standard deviation: It measures the absolute dispersion of variability. It is calculated by following method.

$$S.D. = \sqrt{\frac{\sum X^2 - \frac{(\sum X)^2}{n}}{n-1}}$$

Where $\sum x^2$ = Sum of squares of the individual values.
 $(\sum x)^2$ = The square of the sum of the individual values.

c) Standard error of difference (S.E.D.)

$$S.E.D. = \sqrt{\frac{(SD_1)^2}{N_1} + \frac{(SD_2)^2}{N_2}}$$

Where S.D.1 = Standard Deviation of First Group.
 S.D.2 = Standard Deviation of Second Group.
 N1 = Number of Sources in First Group.
 N2 = Number of Sources in Second Group.

d) T-test: This test was applied to determine whether the observation differences between two sample means X1 and X2 were indicative of real difference or it is due to the sampling error. The t-ratio was calculated with the following formula of t-test:

$$t = \left[\frac{M_1 - M_2}{SED} \right]$$

Where M1 = Mean of First Group.
 M2 = Mean of Second Group.

e) Anova: The purpose of analysis of variance is to test differences in means (for groups or variables) for statistical significance. This is accomplished by analyzing the variance, that is, by partitioning the total variance into the component

that is due to true random error (i.e., within-group SS) and the components that are due to differences between means.

6. Analysis of data and findings

Variables	Yoga male	Handball male	Volleyball male
N	8	10	15
LYM	1.80±0.58	2.61±0.48	2.91±0.58

Table 3: Analysis of Variance (ANOVA) for Lymphocytes of Sportsmen of various categories

Source of Variation	Sum of Squares	df	Mean Square Variance	F-Value
Between Groups	6.53	2	3.27	10.8**
Within Group	9.07	30	0.30	
Total	15.6	32		

** - significant at 0.01 level

Description and interpretation of table 4.1

In table 4.4, the Analysis of Variance for the Lymphocytes concentration in the Subjects of various categories has been presented. The calculated F-value is 10.8, which is more than the table value (df=2;30 – 5.39) at 0.01 levels of significance. It indicates that there exists a significant difference within and between all the three categories of sportsmen for mean concentration of Lymphocytes present in their blood. To find out the degree and direction of difference between various categories for Lymphocytes concentration further analysis was done with the help of t-test.

Table 4: Significance of difference in mean concentration of Lymphocytes present in the Sportsmen of various sports

S. No.	Categories	M1	M2	M.D	S.D 1	S.D 2	S.E.D	T value
1.	Yoga v/s Handball	1.80	2.61	0.81	0.58	0.48	0.25	3.2**
2.	Yoga v/s Volleyball	1.80	2.91	1.11	0.58	0.58	0.25	4.4**
3.	Handball v/s Volleyball	2.61	2.91	0.30	0.48	0.58	0.21	1.43

** - significant at 0.01 level

Description and Interpretation of table 4.1

Table no. 4.1 represents the significant difference in the mean concentration of Lymphocytes present in the blood of sportsmen of various categories. It is indicated in table 4.5 (1) that mean concentration of Lymphocytes present in the blood of sports men of Yoga and Handball were 1.80 and 2.61 respectively, while Standard Deviation of both the groups was 0.58 and 0.48 respectively. The Standard Error of Difference (SED) of both groups was 0.25. The calculated t-value is 3.2, which is more than the table value (df=17 – 2.58) at 0.01 level of significance. It indicates that there exists a significant difference in the mean concentration of Lymphocytes present in the blood of sportsmen of Yoga and Handball. Further, as the mean difference is in favor of Handball sportsmen, it is concluded that the Handball sportsmen were having significantly higher mean concentration of Lymphocytes present in the blood in comparison to Yoga sportsmen.

Table no. 4.1 (2) indicates that mean concentration of Lymphocytes present in the blood of sports men of Yoga and Volleyball were 1.80 and 2.91 respectively, while Standard Deviation of both the groups were 0.58 and 0.58. The Standard Error of Difference (SED) of both groups was 0.25. The calculated t-value is 4.4, which is more than the table value (df=22 – 2.58) at 0.01 level of significance. It indicates that there exists a significant difference in mean concentration of Lymphocytes present in the blood in sportsmen of Yoga and Volleyball. Further as the mean difference is in favor of

Volley ball sportsmen, it is concluded that the Volleyball sportsmen were having significantly higher mean concentration of Lymphocytes present in the blood in comparison to Yoga sportsmen.

In table no. 4.1 (3), the mean concentration of Lymphocytes present in the blood of sportsmen of Handball and Volleyball has been presented which is 2.61 and 2.91 respectively, while Standard Deviation of both the groups were 0.48 and 0.58. The Standard Error of Difference (SED) of both groups was 0.21. The calculated t-value is 1.43, which is less than the table value (df=24 – 1.96) at 0.05 level of significance. It indicates that there exists no significant difference in mean concentration of Lymphocytes present in the blood of sportsmen of Handball and Volleyball.

7. Conclusion

The findings of the current study will add to the existing critical literature of Hematological profile of sports persons and highlight the sports specific role of Hematological profile with respect to training. It would help coaches, physical educators, personal trainers, physiotherapists etc. to scientifically plan training sessions for their elite players especially of Yoga, Handball, Volleyball. It would also assist Dieticians to plan and achieve game related goals for the players. This study will also add a level of awareness for the concerned associates with the elite players. This study will also help to prepare guidelines and norms for selection talent for specific sports. It will also bring consciousness in the

players about their blood profiles. In our study we find that there exists a significant difference in the mean concentration of sportsmen of Yoga, Handball, Volleyball.

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