



Comparative status of mean concentration of platelets presents in the subjects of various sports

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Abstract

The study was conducted to find out the mean concentration of mean platelet volume in sportsmen participating in yoga, Handball, volleyball Thirty-three sports personals were taken as sample who are aged between 18 to 25 and represented Kurukshetra university in all India inter-university. To find out the difference in the mean concentration statistical techniques were employed. The result of the study shows that there exist significant difference in the mean concentration of platelet within and between all the three categories of sportsmen.

Keywords: platelet, handball, volleyball, yoga players

Introduction

Sports is an activity involving physical effort and skill in which an individual or team competes against another or others for entertainment. (Oxford Dictionary). Physical activity is an inherent trait of a human being. It becomes all the way imperative to identify the nature and the degree of this natural talent and to nurture, modifies and refines it to get the cherished outcomes. The children perform a lot of activities such as running, jumping, throwing, catching, kicking and striking etc. The activities are known as natural or universal skills. The twenty first century is the most rapidly of changing century of all time. Rapidity of changes created unusual demands on individuals and on system of education. Today education must not only include the body and knowledge, but also to develop inquiring minds that will enable them to comprehend and accept what is to come tomorrow. The developing tendencies in international sports, especially in team games are identified as the increase in game tempo, tougher body game and greater variability in technique and tactics. An increased performance level can only be achieved by working and training of all major components i.e. technique, coordination, tactics, physical fitness, physiological and psychological qualities. Blood is a lifesaving liquid organ. Whole blood is a mixture of cellular elements, colloids and crystalloids. As different blood components have different relative density, sediment rate and size they can be separated when centrifugal force is applied Hardwick J (2008).

Hematology is the branch of medicine concerned with the study of the cause, prognosis, treatment, and prevention of diseases related to blood. (National Cancer Institute Dictionary). Several parameters that will be analyzed in this study are:

Platelets

A tiny piece of cell that is made by breaking off of a large cell in the bone marrow. Platelets are found in the blood and spleen. They help form blood clots to slow or stop bleeding, and to help wounds heal. Also called thrombocyte National Cancer Institute Dictionary (2014).

Platelets were discovered by the Italian pathologist Giulio Bizzozero in 1882. He observed them microscopically in the circulating blood of living animals and in the blood removed from the blood vessels.

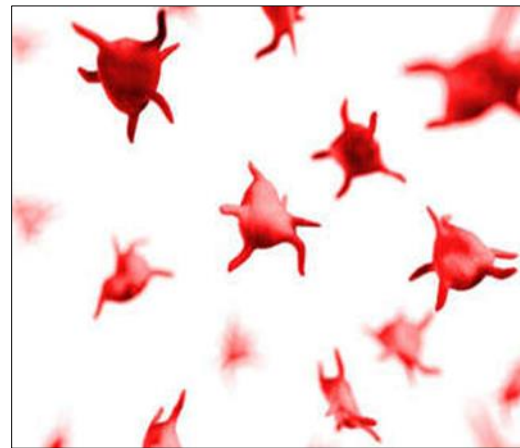


Fig 1

Normal Range is 150-400 Thousand/mcL Shriekha Sairam *et al.* (2013). Wang JS *et al.* (1985) investigated the effects of chronic exercise and deconditioning on platelet role in women, 16 healthy inactive women were divided into control and exercise sets. Our results indicated that, after workout training, resting heart rates and blood pressures were condensed, and exercise performance was improved; resting platelet function was diminished, whereas plasma nitrite and nitrate levels and platelet cGMP contents were enhanced; and the potentiation of platelet duties by acute strenuous workout was decreased, whereas the progress in plasma nitrite and nitrate levels and platelet cGMP contents were improved by acute exercise. Furthermore, deconditioning reversed these training effects. This infers that training-induced platelet functional variations in

women in the mi follicular phase may be intermediated by nitric oxide.

Hematological Analyzer

Haematology analyser are specialized, automated systems that count leucocytes, red cells and platelets in blood, and also determine haemoglobin and haematocrit levels. Haematology technology has come a long way in a relatively short space of time. In the 1950s, complete blood counts (CBC) were performed manually by a technician in front of a microscope National Cancer Institute Dictionary (2014). Modern day analysers are capable of processing hundreds of samples an hour. Modular structures and advances in automation mean that systems can be built to accommodate numerous analysers’, slide maker and archiving facilities.

Statement of the Problem

“Comparative status of Mean concentration of Platelets presents in the subjects of various Sports”

Objectives

To find out the mean concentration of Platelets in sportsmen & sportswomen participating in Yoga, Handball, Volleyball.

Hypotheses of the Study

There exists no significant difference in the mean concentration of Platelets between sportsmen & sportswomen participating in Yoga, Handball, Volleyball.

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:

Categorization of Subjects

Table 1

Men		
Yoga	Handball	Volleyball
8	10	15
Total = 33		

Normal Range

Male - 40.7% -50.3%

Female - 36.1% -44.3% Shrilekha Sairam *et al.* (2013).

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.



Fig 2



Fig 3

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.

Collection of Data

The data collected from all the subjects took place during All India Inter University Training Camps for all the games. 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.

Statistic Techniques Used

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.

Table 4: Significance of difference in mean concentration of Platelets 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	160.13	260	99.87	106.07	79.2	45.09	3.5**
2.	Yoga v/s Volleyball	160.13	293.47	130.34	106.07	83.44	43.25	4.9**
3.	Handball v/s Volleyball	260	293.47	33.47	79.2	83.44	33.04	1.2

** - significant at 0.01 level

Description and Interpretation of Table 4

Table no. 4 represents the significant difference in the mean concentration of Platelets present in the blood of sportsmen of various categories. It is indicated in table 4 (1) that mean concentration of Platelets present in the blood of sportsmen of Yoga and Handball were 160.13 and 260 respectively, while

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:

$$t = \frac{M_1 - M_2}{SED}$$

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.

Analysis of Data and Findings

Table 2: Descriptive Statistics of Haematological Analyzer of subjects for the various categories.

Variables	Yoga Male	Handball Male	Volleyball Male
N	8	10	15
PLT	160.13 ±106.07	260 ±79.2	293.47 ±83.44

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

Source of Variation	Sum of Squares	df	Mean Square Variance	F-Value
Between Groups	93927.39	2	46963.7	11.43**
Within Group	123190.6	30	4106.35	
Total	217117.99	32		

** - significant at 0.01 level

Description and Interpretation of table 3

In table 3, the Analysis of Variance for the Platelets concentration in the Subjects of various categories has been presented. The calculated F-value is 11.43, 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 Platelets present in their blood. To find out the degree and direction of difference between various categories for Platelets concentration further analysis was done with the help of t-test.

Standard Deviation of both the groups was 106.07 and 79.2 respectively. The Standard Error of Difference (SED) of both groups was 45.09. The calculated t-value was 3.5, 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 Platelets 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 Platelets present in the blood in comparison to Yoga sportsmen.

Table no. 4 (2) indicates that mean concentration of Platelets present in the blood of sportsmen of Yoga and Volleyball were 160.07 and 293.47 respectively, while Standard Deviation of both the groups were 106.07 and 83.44. The Standard Error of Difference (SED) of both groups was 43.25. The calculated t-value is 4.9, 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 Platelets present in the blood in sportsmen of Yoga and Volleyball. Further as the mean difference is in favor of Volleyball sportsmen, it is concluded that the Volleyball sportsmen were having significantly higher mean concentration of Platelets present in the blood in comparison to Yoga sportsmen.

In table no. 4 (3), the mean concentration of Platelets present in the blood of sportsmen of Handball and Volleyball has been presented which is 260 and 293.47 respectively, while Standard Deviation of both the groups were 79.2 and 83.44. The Standard Error of Difference (SED) of both groups was 33.04. The calculated t-value is 1.2, 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 Platelets present in the blood of sportsmen of Handball and Volleyball.

Discussion of Hypotheses

According to table no. 4 the calculated F-value is 11.43, 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 Platelets present in their blood. Furthermore table no. 4 shows that the Handball sportsmen were having significantly higher mean concentration of Platelets present in the blood in comparison to Yoga sportsmen, the Volleyball sportsmen were having significantly higher mean concentration of Platelets present in the blood in comparison to Yoga sportsmen and there exists no significant difference in mean concentration of Platelets present in the blood of sportsmen of Handball and Volleyball.

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