

Cross-Sectional Study Of Hematological Variables Among Kayaking, Canoeing And Rowing Players

Baljinder Singh Bal¹, Bhupinder Singh², Maman Paul³, Simran Kaur Bal⁴, Jujhar Singh⁵

¹Department of Physical Education (T), Guru Nanak Dev University Amritsar, Punjab, (India)

²Department of Physical Education & Sports, MGSM Janta College, Kartarpur, Punjab, (India)

³Department of Physiotherapy, Guru Nanak Dev University, Amritsar, Punjab, (India)

⁴Department of Physical Education (T), Guru Nanak Dev University Amritsar, Punjab, (India)

⁵Department of Physical Education, Guru Nanak Dev University College, Kalanaur, Gurdaspur, Punjab, (India)

Abstract

Aim: To find out the differences of Haematological variables among Kayaking, Canoeing and Rowing Players. **Methodology:** A group of 144 male subjects 21-29 years (Mean $\pm$ SD: age 22.006 $\pm$ 1.879 yrs, height 175.243 $\pm$ 5.040 cm, body mass 73.889 $\pm$ 3.512 kg) were selected. The subjects were purposively divided into 4 groups:- Group-A: Guru Nanak Dev University, Amritsar (n₁=36), Group-B: Panjab University, Chandigarh (n₂=36), Group-C: Punjabi University, Patiala (n₃=36) and Group-D: Kurukshetra University, Kurukshetra (n₄=36). **Statistical analysis:** Statistical analysis were performed using the Statistical Package for the Social Sciences for Windows version 16.0 software (SPSS Inc., Chicago, IL). The following parametric statistical technique was used:- ANOVA (Analysis of Variance). Least Significant Difference (LSD) test. The level of significance was set at 0.05. **Results:** It is evident that there is significant difference in Triglycerides (TG) with regard to Inter-University Kayaking, Canoeing and Rowing Players. However, the results further indicate that there is no significant difference in Hemoglobin (Hb), Total Cholesterol (TC), High Density Lipoprotein Cholesterol (HDL-Cholesterol) and Low Density Lipoprotein Cholesterol (LDL-Cholesterol) with regard to Inter-University Kayaking, Canoeing and Rowing Players.

Keywords: Kayaking, canoeing, rowing, haematological variables.

Introduction

Research findings conclude that long-term regular exercise affect positively features such as physical, physiological and psychological parameters of human organisms [1, 2, 3, 4, 5]. Very important effects are observed on hematological parameters which have been found to influence the physical performance of players.

The stability of hematological parameters, specifically with reference to iron status, seems to be of paramount importance with respect to determining hemoglobin (Hb) production, maximal oxygen uptake (VO₂max), and optimal physical performance capacity [6, 7]. However, following intensive training and competition, elite athletes have been found to be at an increased risk of developing iron deficits [8].

Literature has shown how strenuous exercise can facilitate multiple changes in blood parameters of both the components of the blood and those derived from other tissue, mainly muscle [9, 10]. Despite this, there remains limited research concerning the clinical and performance-related significance of hematological and biochemical screening of players within elite Kayaking, Canoeing and Rowing Players.

Methodology

Subjects

A group of 144 male subjects 21-29 years (Mean $\pm$ SD: age 22.006 $\pm$ 1.879 yrs, height 175.243 $\pm$ 5.040 cm, body mass 73.889 $\pm$ 3.512 kg) were selected. The subjects were purposively divided into 4 groups:-

- Group-A: Guru Nanak Dev University, Amritsar ($n_1=36$)
- Group-B: Panjab University, Chandigarh ($n_2=36$)
- Group-C: Punjabi University, Patiala ($n_3=36$)
- Group-D: Kurukshetra University, Kurukshetra ($n_4=36$)

Profile of the respondents are brought forth in **Table-1**.

Table-1: Profile of the respondents.

University	Frequency	Percentages
Guru Nanak Dev University, Amritsar	36	25
Panjab University, Chandigarh	36	25
Punjabi University, Patiala	36	25
Kurukshetra University, Kurukshetra	36	25
Total	144	100.00

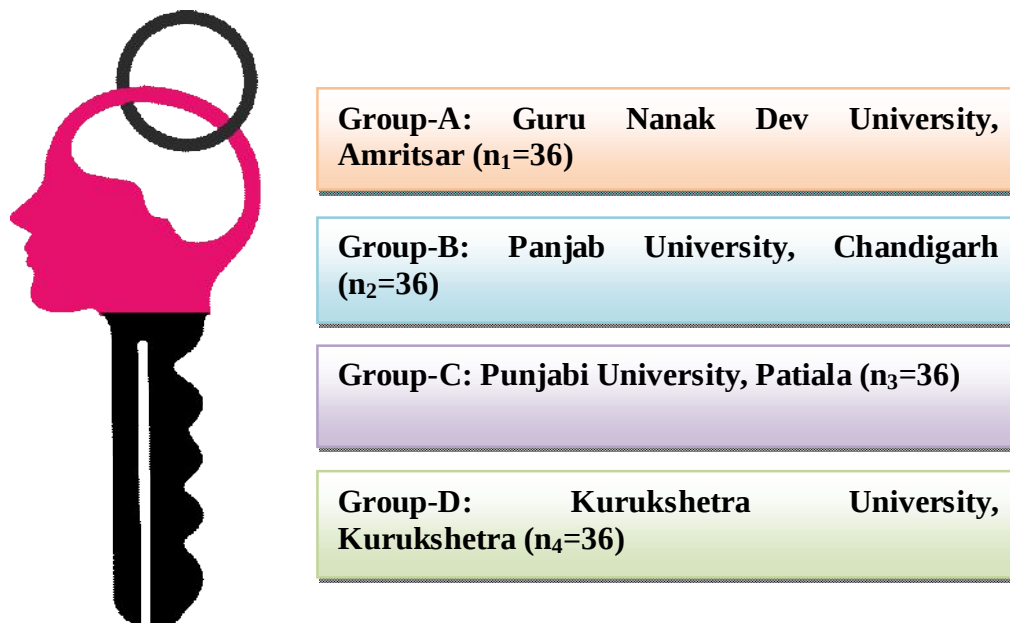


Figure-1: University of respondents.

Statistical Analysis

Statistical analysis were performed using the Statistical Package for the Social Sciences for Windows version 16.0 software (SPSS Inc., Chicago, IL). The following parametric statistical technique was used:-

- ANOVA (Analysis of Variance).
- Least Significant Difference (LSD) test.
- The level of significance was set at 0.05.

Results

Table-2: Analysis of Variance (ANOVA) results with regard to Inter-University Kayaking, Canoeing and Rowing Players on the variable Haematological and its sub-variables.

Hemoglobin (Hb)					
Source of Variation	Sum of Squares	Degree of Freedom	Mean Square	F-Value	P-Value (Sig.)
Between Groups	.162	2	.081	.138	.871
Within Groups	83.059	141	.589		
Total	83.222	143			
Total Cholesterol (TC)					
Between Groups	42.042	2	21.021	.205	.815
Within Groups	14426.958	141	102.319		
Total	14469.000	143			
High Density Lipoprotein Cholesterol (HDL-Cholesterol)					
Between Groups	4.181	2	2.090	.117	.890
Within Groups	2519.708	141	17.870		
Total	2523.889	143			
Low Density Lipoprotein Cholesterol (LDL-Cholesterol)					
Between Groups	221.814	2	110.907	1.538	.218
Within Groups	10167.191	141	72.108		
Total	10389.005	143			
Triglycerides (TG)					
Between Groups	1039.764	2	519.882	4.547*	.012
Within Groups	16120.208	141	114.328		
Total	17159.972	143			

It is evident from **Table-2** that there is significant difference in Triglycerides (TG) with regard to Inter-University Kayaking, Canoeing and Rowing Players. Since F-Value of Triglycerides 4.547* was found significant therefore, Least Significant Difference (LSD) post-hoc test was employed to study the direction and significance of differences between paired means among Inter-University Kayaking, Canoeing and Rowing Players.

However, the results further indicate that there is no significant difference in Hemoglobin (Hb), Total Cholesterol (TC), High Density Lipoprotein Cholesterol (HDL-Cholesterol) and Low Density Lipoprotein Cholesterol (LDL-Cholesterol) with regard to Inter-University Kayaking, Canoeing and Rowing Players.

Table-3: Analysis of post-hoc test results with regard to Inter-University Kayaking, Canoeing and Rowing Players on the variable Triglycerides (TG).

Multiple Comparisons			
Group (A)	Group (B)	Mean Difference	Sig.
Kayaking (1.4623)	Canoeing	.18750	.932
	Rowing	5.79167*	.009
Canoeing (1.4604)	Kayaking	-.18750	.932
	Rowing	5.60417*	.011
Rowing (1.4044)	Kayaking	-5.79167*	.009
	Canoeing	-5.60417*	.011

- A glance at **Table-3** showed that the mean value of Kayaking group was 1.4623 whereas Canoeing group had mean value as 1.4604 and the mean difference between both the groups was found .18750. This shows that the Kayaking group had demonstrated significantly better on Triglycerides (TG) than their counterpart's Canoeing group.
- The mean value of Kayaking group was 1.4623 whereas Rowing group had mean value as 1.4044 and the mean difference between both the groups was found 5.79167*. This shows that the Kayaking group had demonstrated significantly better on Triglycerides (TG) than their counterpart's Rowing group
- The mean value of canoeing group was 1.4604 whereas Rowing group had mean value as 1.4044 and the mean difference between both the groups was found 5.60417*. This shows that the Canoeing group had demonstrated significantly better on Triglycerides (TG) than their counterpart's Rowing group.

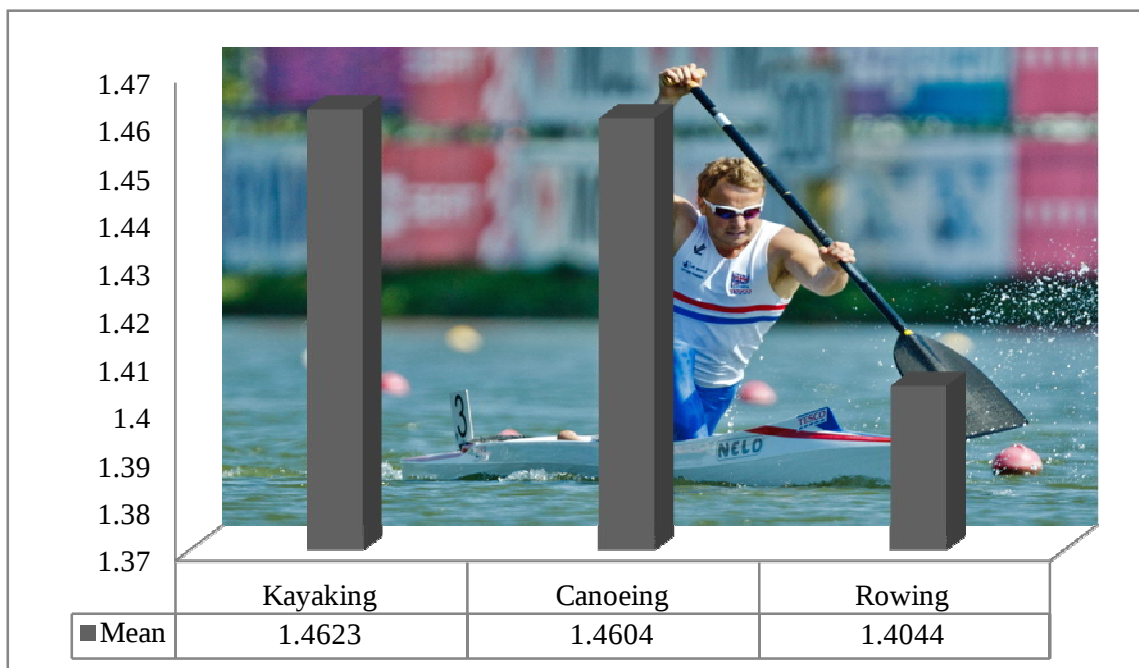


Figure-2: Graphical representation of mean scores results with regard to Inter-University Kayaking, Canoeing and Rowing Players on the variable Triglycerides (TG).

Hypothesis Testing and Discussion

Main Hypothesis

- **Hypothesis-1:-** It was hypothesized that there will be significant differences among Kayaking, Canoeing and Rowing Players on the variable Haematological, Furthermore, the following Sub-hypothesis were formulated:

Sub-hypothesis:-

- i. There will be significant differences among Kayaking, Canoeing and Rowing Players on the sub-variable Hemoglobin (Hb).
- ii. There will be significant differences among Kayaking, Canoeing and Rowing Players on the sub-variable Total Cholesterol (TC).
- iii. There will be significant differences among Kayaking, Canoeing and Rowing Players on the sub-variable High Density Lipoprotein Cholesterol (HDL-Cholesterol).
- iv. There will be significant differences among Kayaking, Canoeing and Rowing Players on the sub-variable Low Density Lipoprotein Cholesterol (LDL-Cholesterol).
- v. There will be significant differences among Kayaking, Canoeing and Rowing Players on the sub-variable Triglycerides (TG).

On the basis of testing of sub-hypothesis the main hypothesis is partially accepted in the case of Triglycerides (TG) and partially rejected in the case of Hemoglobin (Hb), Total Cholesterol (TC), High Density Lipoprotein Cholesterol (HDL-Cholesterol) and Low Density Lipoprotein Cholesterol (LDL-Cholesterol).

Lemura, et al, 2000 carried out a study and concluded that aerobic exercise decreases the level of total cholesterol, LDL cholesterol, triglycerides and increases HDL-cholesterol levels. Schumacher, et al, 2001; Kratz et al, 2002; Fallon, 2004 conducted a study and their results shows that the Higher levels of Haemoglobin have been positively associated with higher performance in aerobic sports as oxygen delivery is found to be increased in aerobic performance of athletes with the increase in total Haemoglobin level in the body. Hence the results of above studies are contradicted in contrast to the current research findings.

Conclusions

It is evident that there is significant difference in Triglycerides (TG) with regard to Inter-University Kayaking, Canoeing and Rowing Players. However, the results further indicate that there is no significant difference in Hemoglobin (Hb), Total Cholesterol (TC), High Density Lipoprotein Cholesterol (HDL-Cholesterol) and Low Density Lipoprotein Cholesterol (LDL-Cholesterol) with regard to Inter-University Kayaking, Canoeing and Rowing Players.

References:

- [1] Banfi, G., Fabbro, M. D., Mauri, C., Corsi, M. M., & Melegati, G. (2006). Haematological parameters in elite rugby players during a competitive season. *Clinical & Laboratory Haematology*, 28(3), 183-188.
- [2] Fox, E. L., Bowers, R. W., & Foss, M. L (1999). *Physiological Foundations of Physical Education and Sports*, Bagirgan Publishing House, Ankara, s.241, 288, 291, 355.
- [3] Manna, I., Khanna, G. L., & Dhara, P. C. (2010). Effect of training on physiological and biochemical variables of soccer players of different age groups. *Asian journal of sports medicine*, 1(1), 5.

- [4] Schumacher, Y. O., Schmid, A., Grathwohl, D., Bultermann, D., & Berg, A. (2002). Hematological indices and iron status in athletes of various sports and performances. *Medicine and Science in Sports and Exercise*, 34(5), 869-875.
- [5] Thiago Santi, M., Arruda, M., Portella, D., Vargas Vitoria, R., Gomez Campos, R., Martinez, C., Carrasco Salazar, V., & Cossio-Bolanos, M. (2013). Hematological Parameters of Elite Soccer Players during the Competitive Period. *Journal of Exercise Physiology Online*, 16(5), 68-76.
- [6] Escanero JF, Villanueva J, Rojo A, Herrera A, del Diego C, Guerra M. (1997). Iron stores in professional athletes throughout the sports season. *Physiol Behav*. 62:811–814.
- [7] Schumacher YO, Schmid A, Grathwohl D, Bültermann D, Berg A. (2002). Hematological indices and iron status in athletes of various sports and performances. *Med Sci Sports Exerc*. 34:869–875.
- [8] Tan D, Dawson B, Peeling P. (2012). Hemolytic effects of a football-specific training session in elite female players. *Int J Sports Physiol Perform*. 7:271–276.
- [9] Fallon KE, Sivyer G, Sivyer K, Dare A. (1999). Changes in haematological parameters and iron metabolism associated with a 1600 kilometre ultramarathon. *Br J Sports Med*. 33:27–31.
- [10] Landahl G, Adolfsson P, Borjesson M, Mannheimer C, Rodjer S. (2005). Iron deficiency and anemia: a common problem in female elite soccer players. *Int J Sport Nutr Exerc Metab*. 15:689–694.

Correspondence Address:

Bhupinder Singh

Assistant Professor

Department of Physical Education & Sports

MGSM Janta College, Kartarpur, Punjab, India

E-Mail: bhupidhaliwal86@gmail.com, bal_baljindersingh@yahoo.co.in

Contact: + 91-9988534253