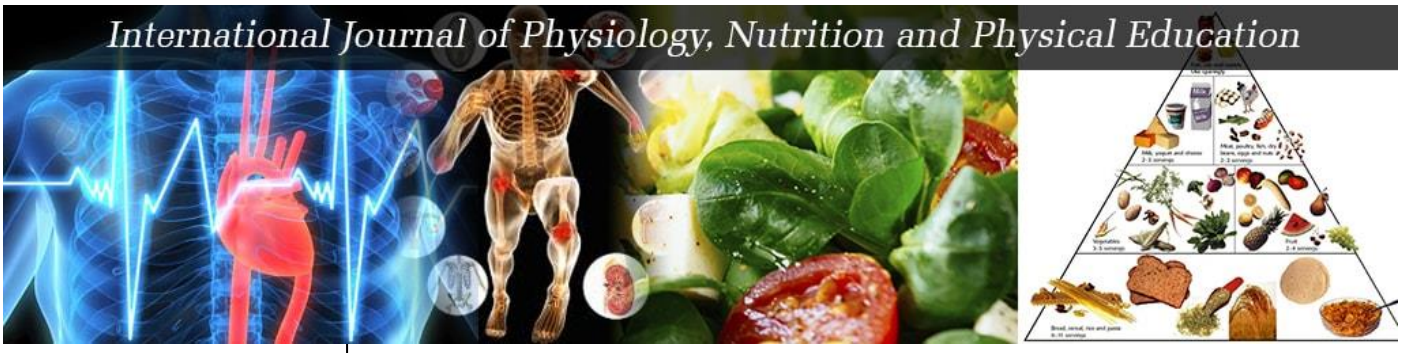

ISSN: 2456-0057
IJPNPE 2019; 4(1): 272-275

www.journalofsports.com
Received: 01-11-2018
Accepted: 04-12-2018

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A study of biochemical analyses of inter-college kayaking and canoeing players: A cross sectional study

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Abstract
The aim of this study was to investigate the difference of Haematological Parameters between Kayaking and Canoeing players. To obtain required data, the investigators had selected Eighteen (N=18), male college level Kayaking and Canoeing players between the age group of 18 - 25 years (Mean ± SD: age 23.16 ± 2.21 yrs, height 173.61 ± 4.79 ft, body mass 74.52 ± 4.24 kg) to act as subjects. They were divided into two groups; (i.e., n_1=9; kayaking players, n_2=9; Canoeing players). The purposive sampling technique was used to select the subjects. All the subjects, after having been informed about the objective and protocol of the study, gave their consent and volunteered to participate in this study. Unpaired t-test was employed for data analyses. The results revealed significant difference with regard to the sub-variables Low Density Lipoprotein Cholesterol (LDL-Cholesterol. However, No significant differences were found on the sub-variables: Haemoglobin, Total Cholesterol (TC**)** High Density Lipoprotein Cholesterol (HDL-Cholesterol) and Triglycerides (TG).

Keywords: Haemoglobin, total cholesterol, low density lipoprotein cholesterol, high density lipoprotein cholesterol, triglycerides, kayaking and canoeing players

Introduction

In sports physiology, blood is particularly important as it carries oxygen, carbon dioxide, and other substances required by tissues (Edington & Edgerton, 2004) [4] Ahmadizad, & El-Sayedm, 2003) [2]. The term 'lipid profile' portrays the changing levels of lipids in the blood, the most ordinarily revealed ones being low-density lipoprotein (LDL) cholesterol, high-density lipoprotein (HDL) cholesterol and triglycerides. Abnormal states of LDL cholesterol show surplus lipids in the blood, which thusly increment the danger of cardiovascular problems. HDL cholesterol transports lipids back to the liver for reusing and transfer; therefore, elevated amounts of HDL cholesterol are a pointer of a sound cardiovascular framework (Carroll *et al*, 2012) [3] Triglycerides in plasma are developed from fats eaten in food or from other vitality sources. The excess accumulation of triglycerides in plasma is decidedly and autonomously related with cardiovascular illness. Low-density lipoprotein cholesterol—which is by and largeless every now and again announceds in the writing—has been appeared to decidedly correspond with triglycerides and to be autonomously related with cardiovascular hazard, even in people who express ordinary LDL cholesterol levels. This is underscored by the concentration of continuance competitors on expanded haemoglobin through training at altitude or exogenous erythropoietin (Tokish *et al*. 2004) [4] A few different parts of the hematologic framework can likewise influence or be impacted by physical activities. Most imperative impact of activity on kayaking and canoeing players are constriction of arterioles prompting diminished blood-on metabolic framework particularly lipids which incorporates – weight. Physical movement and wellness are imperative cholesterol, phospholipids and triglycerides (Kravitz and Heyward, 1994) [5] it is all around acknowledged that elevated amounts of total cholesterol, triglycerides, LDL-C and low levels of HDL-C are the hazard factors for coronary illness. Physical exercises performed with adequate frequency and power is compelling in bringing down the levels of TG and LDL and raising the level of HDL (Fauci *et al*, 2004) [6] While the systems hidden the impact of activity on the lipid profile are unclear, practice appears to upgrade the capacity of skeletal muscles to use lipids as restricted to glycogen, in this manner decreasing plasma lipid levels.

The instruments may incorporate increments in lecithin cholesterol acyltrans (LCAT)-the catalyst in charge of ester exchange to HDL cholesterol, which has been appeared to build following activity preparing-and increments in lipoprotein lipase movement, despite the fact that the information in this example are conflicting and may depend upon the vitality use that is elicited.

In the present study, the researchers quickly examine acquired variations from kayaking and canoeing players on haematological parameters. Traditionally, research into kayaking and canoeing are primarily focused on physiological testing of the athletes in order to determine fitness levels and then designing training programs to optimize physiological fitness (Aitken and Neal, 1992) [7]. Early studies only analysed deference between kayaking and canoeing player on variable of haematological parameters.

2. Method

2.1 Subjects

Eighteen (N-18), male college level Kayaking and Canoeing players between the age group of 18-25 years (Mean ± SD: age 23.16±2.21 yrs, height 173.61±4.79 ft, body mass 74.52±4.24 kg) volunteered to participate in the study. The subjects were purposively assigned into two groups:

- Group-A: Kayaking Players (n1 = 9)
- Group-B: Canoeing Players (n2 = 9)

All the subjects were informed about the objective and protocol of the study. Distribution and demographics of subjects are brought forth in Table 1.

Table 1: Distribution and demographics of subjects

Sample Size (N=18)			
Variables	**Total (N=18)**	**Kayaking (n_1=9)**	**Canoeing (n_2=9)**
Age	23.16±2.21	23.56 ± 1.94	22.78 ± 2.64
Height	173.61±4.79	170.56 ± 3.56	176.67 ± 3.87
Weight	74.52±4.24	72.71 ± 3.52	76.33 ± 4.30

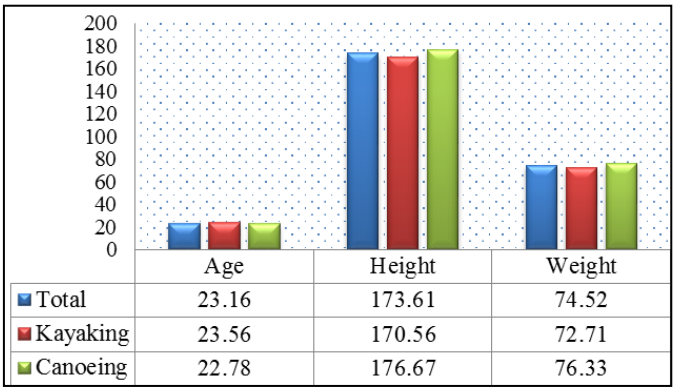

Fig 1: Distribution and demographics of subjects

2.2 Procedure

Haemoglobin was determined in the blood samples of all the subjects with the use of a haematology analyzer (Celldyne model 3500). Blood samples (10 ml) for the determination of lipid profiles were obtained. All of biochemical tests have been done with serum samples. Lipid parameters (Triglyceride; Cholesterol; Low-density lipoprotein; High-density lipoprotein) were measured using Boehringer Mannheim kits and Clinilab, Bio Meraux analyser as used by Jastrzebska *et al*. (2002). The Collection of Biochemical tests with Serum Canoeing Samples.

3. Statistical Procedure Used

Statistical analysis was performed using SPSS version 16.0 for windows (SPSS Inc, Chicago, IL, USA). Data are expressed as the mean ±SD. Unpaired t-test was employed for data analyses. For testing the hypotheses, the level of significance was set at 0.05.

4. Results

Table 2: Descriptive Statistics (Mean & Standard Deviation) of Haematological Parameters of Kayaking and Canoeing Players

Haemoglobin (Hb)						
Group	**N**	**Mean**	**Std. Deviation**	**Std. Error**	**t-value**	**p-value**
Kayaking	9	14.366	1.00	.334	-.902	.38
Canoeing	9	14.766	0.874	.291	-.902	.38
Total Cholesterol (TC)						
Group	N	Mean	Std. Deviation	Std. Error	t-value	p-value
Kayaking	9	179.66	6.819	2.273	1.83	.085
Canoeing	9	173.11	8.237	2.745	1.83	.085
Low Density Lipoprotein Cholesterol (LDL-Cholesterol)						
Group	N	Mean	Std. Deviation	Std. Error	t-value	p-value
Kayaking	9	106.95	7.185	2.395	2.21	.042
Canoeing	9	98.53	8.889	2.963	2.21	.043
High Density Lipoprotein Cholesterol (HDL-Cholesterol)						
Group	N	Mean	Std. Deviation	Std. Error	t-value	p-value
Kayaking	9	44.11	3.333	1.111	-1.27	.22
Canoeing	9	46.22	3.70	1.23	-1.27	.22
Triglycerides (TG)						
Group	N	Mean	Std. Deviation	Std. Error	t-value	p-value
Kayaking	9	146.22	5.517	1.839	.052	.959
Canoeing	9	146.00	11.543	3.847	.052	.959

The Mean and Standard Deviation values of Haemoglobin (Hb) of kayaking group were 14.366± 1.00. However, the Mean and Standard Deviation values of Canoeing group were 14.766± 0.874. The Mean and Standard Deviation values of Total Cholesterol (TC) of kayaking group were 179.66± 6.819. However, the Mean and Standard Deviation values of Canoeing group were 173.11± 8.237. The Mean and Standard Deviation values of Low Density Lipoprotein Cholesterol (LDL-Cholesterol of kayaking group were 106.95 ± 7.185. However, the Mean and Standard Deviation values of Canoeing group were 98.53 ± 1.715. The Mean and Standard Deviation values of High Density Lipoprotein Cholesterol (HDL-Cholesterol) of kayaking group were 44.11 ± 3.333. However, the Mean and Standard Deviation values of Canoeing group were 46.22 ± 3.70. The Mean and Standard Deviation values of Triglycerides (TG) of kayaking group were 146.22 ± 5.517. However, the Mean and Standard Deviation values of Canoeing group were 146.00 ± 11.543. Table 1 presents significant differences with regard to the sub-variables Low Density Lipoprotein Cholesterol (LDL-Cholesterol. However, No significant differences were found on the sub-variables: Haemoglobin (Hb), Total Cholesterol (TC), High Density Lipoprotein Cholesterol (HDL-Cholesterol) and Triglycerides. The graphical representation of responses has been exhibited in (Figure 1).

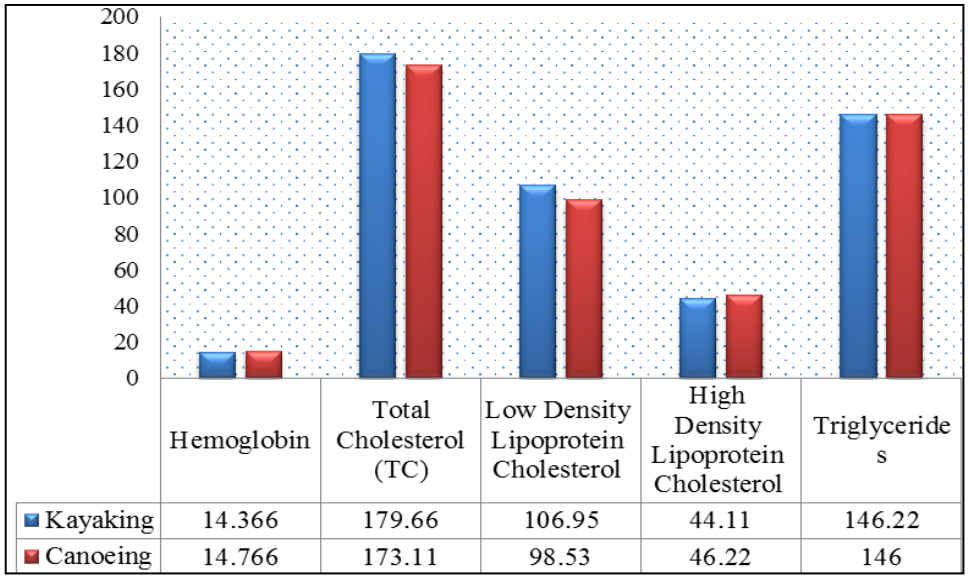

Fig 2: Graphical depiction of means of Haematological Parameters of Kayaking and Canoeing Players

5. Discussion

The purpose of this study was to examine the Biochemical parameters of Kayaking and Canoeing players. Both Kayaking and Canoeing are paddling sport that demand tremendous aerobic fitness. Previous research has highlighted the importance of physical training and exercise duration in the variation of blood cells (Shivalingaiah *et al*, 2015) [8]. The concentration of Haemoglobin in both Kayakers and Canoeing were found optimal and do not exhibit any significant difference between the both groups. The findings obtained after testing the Haemoglobin are comparable to the outcomes on runners (Shivalingaiah *et al*, 2015) [8]. Higher levels of Haemoglobin have been associated with higher performance in aerobic sports as oxygen delivery is found to be increased in aerobic athletes with the increase in total Haemoglobin (Schumacher, *et al*, 2001; Kratz *et al*, 2002; Fallon, 2004) [9, 10]. It has been well established that consistency in aerobic exercise decreases the total cholesterol, LDL cholesterol, triglycerides and increases HDL-cholesterol levels (Lemura, *et al*, 2000) [12]. This study confirmed this fact as canoeist and Kayakers have optimal level of total cholesterol, LDL cholesterol, triglycerides and increases HDL-cholesterol. Comparatively, canoeing possess lower values of total cholesterol, LDL cholesterol, triglycerides and higher level of HDL-cholesterol than Kayakers, however, the differences were significant only in LDL cholesterol. These findings are supporting a previous study which found that engagement in aerobic activities may reduce the concentration of triglycerides and increase HDL-cholesterol (Lemura, *et al*, 2000) [12]. The significant higher concentration of LDL-cholesterol in Kayakers are in agreement with the results of previous studies which found that aerobic exercise could make inconsistent and trivial changes on LDL-cholesterol (Lemura, *et al*, 2000; Nybo *et al*, 2010; Kraus *et al*, 2002; O'Donovan *et al*, 2005) [12, 13, 14, 15]. Even though the mechanism of changes in lipid profile brought up by exercise is imprecise, aerobic activity it may rise blood lipid depletion henceforth to drop lipids concentration (Earnest *et al*, 2013) [16].

6. Conclusion

Based on the analysis of the results obtained, we conclude that the significant difference was found with regard to the sub-variables Low Density Lipoprotein Cholesterol (LDL-Cholesterol. However, No significant differences were found on the sub-variables: Haemoglobin, Total Cholesterol (TC**)** High Density Lipoprotein Cholesterol (HDL-Cholesterol) and Triglycerides (TG).

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