ORIGINAL ARTICLE

COMPARISON OF SELECTED PHYSIOLOGICAL AND BIOCHEMICAL VARIABLES AMONG DIFFERENT CATEGORIES OF ATHLETES

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Abstract:

The purpose of the study is to find out the significant differences on selected physiological and biochemical variables of sub junior, junior and senior athletes. A total of 60 athletes selected for the study, were grouped (n =20) into 3 groups: (i) under sub-junior, junior and senior group athletes on age category basis. The physiological variables like resting heart rate and breath holding capacity and hemoglobin and uric acid as biochemical variables. The data were collected and tabulated accordingly. The One-Way ANOVA statistical technique was used to find out the significant difference between the groups. No significant difference in the resting heart rate and breath holding time as physiological variables. The hemoglobin and uric acid as biochemical variables shows insignificant differences among different categories of athletes. This study would provide useful information for training and selection of athletes of different categories of athletes.

KEY WORDS:

physiological, biochemical, categories, athletes.

INTRODUCTION

In the order of human values conquest in field of sports hold a unique plane. It is the combination of success, victory, triumph and domination of mover other team mates and friends. Sports play a very prominent role in the modern society which is important to individuals, a group, a nation and indeed the world. Throughout the world, sport has a popular appeal among people of all ages. Sports by their nature are enjoyable, challenging and absorbing, and require a certain amount of skills and physical condition. Physiology is the study of functions of the human body. Human physiology is the bird in the house of the mechanical, physical and biochemical functions of humans in good health, their organs and the cells of which they are composed. The physiological variables are plays an important role for the attainment of high level sports performance. Physiological variables may be defined as those variables which are directly linked with various physiological systems such as heart rate, blood pressure, vital capacity and respiratory rate.

Biochemical parameters like blood lactate, hemoglobin, urea, uric acid and lipid profiles have an advantage in regulating the training load. Assessment of blood lactate levels during pre and immediately post exercise can be useful to determine the lactate threshold level during training and competition. [Nielsen, M.S. and Weber (2007]. The training induced changes observed in various biochemical variables can be attributed to appropriate load dynamics. This would enable the coaches to assess the current status of an athlete and the degree of training adaptability and provide an opportunity to modify the training schedule accordingly to achieve the desired performance. [Bompa, 1999] Hemoglobin (Hb) is the iron-containing oxygen-transport metalloprotein in the red blood cells of all vertebrates [Maton, 1993] as well as the

tissues of some invertebrates. Hemoglobin in the blood carries oxygen from the respiratory organs (lungs or gills) to the rest of the body (i.e. the tissues) where it releases the oxygen to burn nutrients to provide energy to power the functions of the organism in the process called metabolism. Hemoglobin represents the iron status of the body. Oxygen is transported to muscle primarily by hemoglobin. The aerobic exercise the demand of oxygen increases at the working muscle, so an optimum level of hemoglobin is required to perform at the highest level with high intensity. As athletic performance depend much on the aerobic component of the athlete, therefore the athletes need to maintain normal hemoglobin level to optimize performance. The uric acid is used for assessment of training related stress.[Urhausen, A. and Kindermann, 2002] During the training these parameters may be evaluated at regular intervals to assess the training load imposed on the athlete.

It has been due to the growing change in the competitive philosophy of sports that a close liaison has developed among sports scientist, team physician, athletic trainers, coaches and athletes to investigate modern scientific technique in terms of selection of athletes. Best suited activity and new training methods achieve excellence. It is universally accepted that the physiological functions vital capacity, heart rate and breath holding time of the body improve with use and decline with disuse. The purpose of the study was to determine the differences in physiological and biochemical variables among different category athletes.

OBJECTIVE OF THE STUDY

To find out the difference in the physiological variables (heart rate and breath holding time) and biochemical variables (hemoglobin and uric acid) between sub junior, junior and senior athletes.

HYPOTHESIS

It was hypothesized that there will be no significant difference in the selected physiological and biochemical variables among different categories of athletes.

METHODOLOGY

Sample : For the purpose of study 20 male athletes each from sub junior, junior and senior level athletes were selected as subject who had participated at state level competitions. The age group of subjects was ranging from 16-20

Variables : The physiological variables like resting heart rate (bio monitor), breath holding time (manual method) and biochemical variables hemoglobin and uric acid were selected as variables with the help medical lab assistants. The data were collected and tabulated accordingly.

Method of Analysis : The One-Way ANOVA statistical technique was used to find out the significant difference among different categories of athletes and Scheffe's post-hoc test was applied to find out which of the differences of the means amongst the different categories of athletes. A value of 0.05 was considered as significant.

RESULTS AND DATA ANALYSIS

All the raw data of anthropometric, physiological and psychological variables were statistically analyzed and results were presented in the following tables..

Table-1(a): Analysis of Variance for the data on anthropometrical, physiological and psychological variables between sub junior, junior and senior athletes (N=60)

Criterion Variables	Levels			Mean Difference and Sig. Level	Critical Difference
	Sub Junior	Junior	Senior		
Resting Heart Rate	86.150	79.600		6.550	6.833
		79.600	65.900	13.700*	
	86.150			20.250*	
Breath Holding Time	54.050	57.050		3.000	6.317
		57.050	60.950	3.900	
	54.050		60.950	6.900*	
Uric Acid	4.670	5.180		0.510	0.602
		5.180	5.440	0.260	
	4.670		5.440	0.770*	

*Significant at 0.05 level of confidence.

Table shows significant paired mean differences on resting heart rate between junior & senior and sub-junior & senior athletes; and the values are 13.700 and 20.250 which are greater than the critical difference value 6.833 at 0.05 level of confidence. It concludes that "there was significant differences exist in resting heart rate between junior & senior and sub-junior & senior athletes. No significant difference exists in the resting heart rate between sub-junior and junior athletes.

Table shows significant paired mean differences on breath holding time between junior & senior athletes and the value is 6.900 which is greater than the critical difference value 6.317 at 0.05 level of confidence. It concludes that "there is significant difference exists in breath holding time between junior & senior athletes. No significant difference exists in the breath holding time between sub-junior & junior and junior & senior athletes.

Table shows significant paired mean differences on uric acid between junior & senior athletes and the value is 0.770 which is greater than the critical difference value 0.602 at 0.05 level of confidence. It concludes that "there is significant difference exists in uric acid between junior & senior athletes. No significant difference exists in the breath uric acid between sub-junior & junior and junior & senior athletes.

CONCLUSION

The senior athletes have better heart rate, breath holding and uric acid than junior and sub junior athletes. The all category athletes have similar hemoglobin content. The information derived from this study will not only serve coaches in their selection of young athletes, but provide guidelines for training programs for sub junior, junior and senior athletes.

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