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A study of physiological variables among male cricketers of Chandigarh

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Abstract

The main purpose of the study was to compare the physiological variables (systolic blood pressure, diastolic blood pressure and resting pulse rate) among fast bowlers, spinners and batsmen of state level of cricketer of Chandigarh (India). To achieve the objective of the study, sixty (60) state level cricketers (20 fast bowlers, 20 spinners and 20 batsmen) were taken purposively as a subject for the study. The age of the subjects ranged between 19-25 years. Systolic Blood Pressure was recorded as the maximum pressure the contraction phase of the heart recorded in mmHg. Diastolic Blood Pressure recorded as the maximum pressure during the relaxation phase of the heart was recorded in mmHg. Pulse Rate was recorded as the number of pulse beats/minute felt at the radial artery. To determine the significance difference on physiological variables, analysis of variance (ANOVA) was computed with the help of SPSS software. The level of significance was set at 0.05. Statistical calculation on gathered data showed that there were no significances differences found on physiological variables (resting pulse rate, systolic blood pressure, and diastolic blood pressure).

Keywords: physiological, cricketer, male, inter college player

Introduction

Exercise refers to exertion of muscles, links etc for health sake. Game denotes physical exertion for amusement or competition governed by definite rules. Sports mean all those physical activities done for diversion, amusement, pleasure or success (Sharma, 2005) ^[10]. Cricket was introduced to North America by the English colonies in the 17th century probably before it had even reached the north of England. In the 18th century it started in other parts of the globe. It was introduced to the West Indies by colonists and to India by British East India Company mariners in the first half of the century (Srivastava, 2007) ^[12]. Cricket is a game in which each team has to bowl and bat according to certain rules and regulations. A team which scores greater number of runs will be the winner (Raman, 1983) ^[6].

It has been suggested that the physiological demands of cricket are relatively mild, except in fast bowlers during prolonged bowling spells in warm conditions. However, the physiological demands of cricket may be underestimated because of the intermittent nature of the activity and the generally inadequate understanding of the physiological demands of intermittent activity (Noakes).

Blood pressure is exerted by the blood on the walls of the blood vessels, and the term usually refers to arterial blood pressure. It is expressed by two numbers, the systolic blood pressure and the diastolic blood pressure. The higher number is the systolic blood pressure: it represents the highest pressure in the artery and corresponds to ventricular systole of the heart. Ventricular systole contraction pushes the blood through the arteries with tremendous force, which exerts high pressure on the arterial walls. The lower number is the Diastolic blood pressure and represents the lowest pressure in the artery, corresponding to ventricular diastole when the ventricle is filling. In an adult, the systolic pressure ranges from 110-125 mm/Hg. and the diastolic pressure ranges from 65-85 mm/ Hg. is considered normal. The varying range in the blood pressure occurs due to the changes in the varying circulatory parameters like the increased cardiac output. An increased cardiac output will increase the blood flow in the arteries which will increase the pressure within the walls of the arteries. The size of the blood

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vessels also determines blood pressure. The resistance to the blood flow will increase with the decrease in the size of the blood vessels (vasoconstriction). The heart has to forcefully pump the blood through these small vessels, there by increases the blood pressure. However with an increase in the size of the blood vessels (vasodilation) the resistance to flow will be decreased and the blood pressure also will be reduced. Blood volume is another factor influencing blood pressure. With larger volumes blood, the blood pressure will increase and with smaller volumes it will decrease (Sahaya, 2012). The sufficient amount of blood must be circulating in the vessels to maintain the normal blood pressures, example, if hemorrhage has occurred and a large amount of blood is lost, there is an accompanying fall in the blood pressure (Ross and Wilson, 1992)^[8].

The Pulse is described as a wave of distension and elongation felt in an artery wall due to the contraction of the left ventricle forcing about 60 to 80 milliliters of blood into the already full aorta. When the aorta is distended, a wave passes along the walls of the arteries and can be felt at any point where an artery can be pressed gently against a bone (Ross Wilson, 1992)^[8]. Pulse is a regular jerk of an artery. Therefore it is also called arterial pulse. The Pulse pressure is the difference between the measured systolic and diastolic pressure.

$$P \text{ pulse} = P_{\text{sys}} - P_{\text{dias}}$$

Pulse pressure is determined by the interaction of the Stroke volume of the heart, the compliance (ability to expand) of the arterial systems-largely attributable to the arterial system-largely attributable to the aorta and large-elastics arteries, and the resistance to flow the arteries tree. By expanding under

pressure, the aorta absorbs some of the force of the blood sugar from the heart during a heartbeat. In this way, the pulse pressure is reduced from what is would be if the aorta weren't compliant (Richard, 2011)^[7]. Resting heart rate/resting pulse rate averages 60 to 80 beats/min. in middle -aged, unconditioned, sedentary individuals the resting rate can exceed 100 beats per min. In highly conditioned endurance-trained athletes, resting rates in the range of 28 to 40 beats per min have been reported (Wilmore, 1994)^[13].

Objectives of the study

The objective of the study is to determine the physiological variables (resting pulse rate and blood pressure) among state level male fast bowlers, spinners and batsmen.

Materials and Methods

The study was descriptive study focusing on physiological variables among cricketers of Chandigarh. A sample of sixty inter-college level cricketers (20 batsmen, 20 spinners and 20 fast bowlers) of age group 19-25 was taken purposively as a subject for the study. In consultation with experts and considering tester's competency and even feasibility criterion in mind, especially of equipments reliability and time factor, the following variables were selected for the study namely, Physiological Variables (Resting Pulse Rate and Blood Pressure). Resting Pulse Rate was recorded as the number of pulse beats/minute felt at the radial artery. Systolic Blood Pressure recorded as the maximum pressure the contraction phase of the heart recorded in mmHg. Diastolic Blood Pressure recorded as the maximum pressure during the relaxation phase of the heart recorded in mmHg.



Fig 1: Illustrations of Blood Pressure Measurement.

Results and Findings

The collected data was tabulated and computerized to draw out the desired results. For testing the significance in physiological variables among state level male cricketers, the

level of significance was chosen 0.05. Descriptive analysis of physiological variables (blood pressure and resting pulse rate) among state level male fast bowlers, spinners and batsmen of Chandigarh are presented in table 1.

Table 1: Descriptive analysis of fast bowlers, spinners, and batsmen on physiological variables.

Variable	Group	N	Mean	SD
Resting Pulse Rate	Fast bowler	20	81.1000	15.96345
	Spinner	20	81.4500	13.64001
	Batsmen	20	79.3500	14.74797
Systolic Blood Pressure	Fast bowler	20	129.40	10.87440
	Spinner	20	136.15	13.20397
	Batsmen	20	126.95	12.38622
Diastolic Blood Pressure	Fast bowler	20	72.0000	8.26534
	Spinner	20	75.8500	10.17880
	Batsmen	20	68.4000	12.72130

The Analysis of Variance (ANOVA) among state level male batsmen, spinners and fast bowlers of Chandigarh is presented in table -2.

Table 2: Anova of fast bowlers, spinners and batsmen on physiological variables.

Variable	Source of Variance	Sum of Squares	df	Mean Square	F
Resting Pulse Rate	Between Group	50.633	2	25.317	.115
	Within Group	12509.300	57	219.461	
	Total	12559.933	59		
Systolic Blood Pressure	Between Group	908.033	2	454.017	3.054
	Within Group	8474.300	57	148.672	
	Total	9382.333	59		
Diastolic Blood Pressure	Between Group	555.233	2	277.617	2.495
	Within Group	6341.350	57	111.252	
	Total	6896.583	59		

*Significant at .05 level, $F_{0.05}(2, 57) = 3.15$

Table-2 clearly indicates that there were no significant differences among three groups on resting pulse rate and blood pressure (systolic blood pressure and diastolic blood pressure), since the obtained 'F' values at 0.05 level were .115 resting pulse rate, 3.054 (Systolic Blood Pressure) and

2.495 (Diastolic Blood Pressure) whereas, value needed to be significant was 3.15.

Mean scores of different three groups on blood pressure and resting pulse rate are depicted graphically in figure-2.

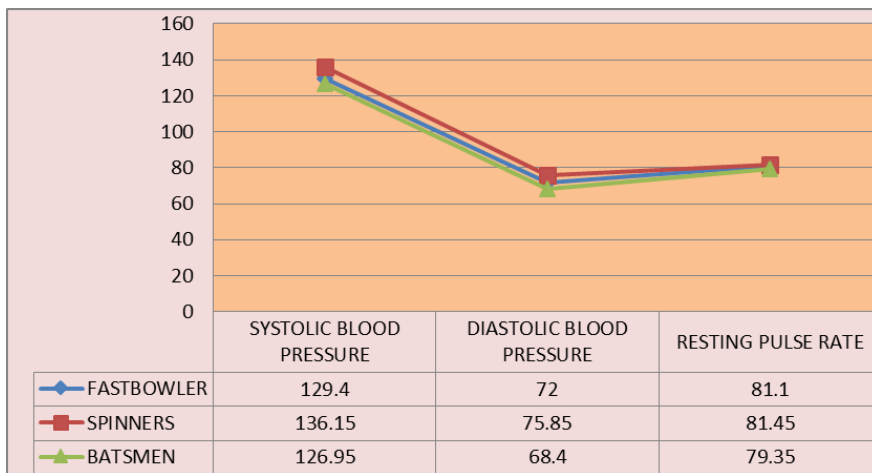


Fig 2: Graphical Representation of Mean Scores of Fast Bowlers, Spinners and Batsmen on Blood Pressure and Resting Pulse Rate

Findings of the study

The findings of the study indicate that there were no significant differences obtained among state level male fast bowlers, spinners and batsmen of Chandigarh on resting pulse rate and blood pressure (Systolic & Diastolic), since the obtained 'F' values at 0.05 level were .115 resting pulse rate, 3.054 (systolic blood pressure) and 2.495 (Diastolic Blood Pressure) whereas, value needed to be significant was 3.15. Probable reason could be that the subjects of the study were living under same geographical, cultural and environmental condition and the fitness level of the players were also quite similar as they were from same age group and level.

Koul (2009) [2] conducted a study on "anthropometric physiological and physical profiles of the cricketers" with purpose of preparing anthropometric physiological and physical profiles of cricketers. The study concluded that subjects were differ in anthropometric, physiological and physical characteristics, fast bowlers were found greater in body fat, leg length, chest girth, calf girth, lean body weight, blood pressure, hemoglobin content, vital capacity and anaerobic capacity than spinners and batsmen. But batsmen were found having lower resting pulse rate than fast bowlers and spinners. With respect of strength, speed and endurance fast bowlers were found significantly better than batsmen and spinners. Negi, et.al (2012) [4] also has similar type of result; they conduct a study to compare the physiological variables of female cricket players at different levels of participation, physiological variables as blood pressure (diastolic and systolic), pulse rate, breath holding, and respiratory rate were

measured. The findings shows that players of Group-I (Interuniversity and national level) are better in blood pressure diastolic, pulse rate, respiratory rate and breath holding from the Group-II (Inter-college and State Level) women cricket players. The various sub-disciplines of cricket have different physical, anthropometrical and physiological requirement. The sub-discipline differences in physiological requirement are almost negative because all the players fulfilled the demanding and have same training routines. The present study has found that there are no significant differences found on physiological variables; therefore it can be conclude that due to their same level, their no of participation, conditioning and practice are same. Their body has similar capacity to bear stress, load etc. Their body has identical nature of intake of air and to utilize its oxygen more efficiently and effectively resulting improvement in capacities of lungs cardio-vascular system and respiratory system etc. If the physical educator knows the upper limits of players, physiological power and heart rate, the trainer can monitor physiological variables of the players which the intensity of the workload and limits of energy expenditure help them to maintain of the players which help them to attain their goal for their task.

Conclusion

Statistical calculation on gathered data showed that there were no significances differences found on physiological variables (resting pulse rate, systolic blood pressure, and diastolic blood pressure).

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