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COMPARATIVE ANALYSIS ON PHYSIOLOGICAL VARIABLES OF FAST BOWLERS AND BATSMAN IN CRICKET

***M.Kumar**, ****Dr.S.Gladykirubakar**

*Assistant Professor , AMET University , Chennai

**Assistant Professor ,YMCA College of Physical Education, Chennai.

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ABSTRACT

The purpose of the present study is to compare the physiological variables of fast bowlers and batsman in cricket at Inter University and Inter College levels of participation. The study administered on 30 Cricket players in the age group 18-25 years of different University belonging to AMET University, Madras University, Anna University and Hindustan University on the stratified random sampling basis. Physiological variables as blood pressure (diastolic and systolic), pulse rate, and respiratory rate measured. As per results of the physiological variables, the players of Group-I (Inter-University level) were found better in blood pressure diastolic, pulse rate and respiratory rate from the players of Group-II (Inter-college level cricket players) . This significant difference was found at .05 levels of confidence and on 99 degree of freedom and also on .01 levels. The inter college and inter university level cricket players have better mean value in all the physiological variable such as blood pressure (diastolic), pulse rate and respiratory rate. The statistically insignificant difference was found in the blood pressure systolic between the two groups of cricket players. The mean difference of two groups of Cricket players in blood pressure systolic and found the difference insignificant. The mean value difference between the two groups was 1.00. The standard error denoted as SE =.52. The value of t-test was found 1.92, which is insignificant to the tabulated value't' 5 (.99 = 1.99). The difference between the two groups was very less, which indicates that they were almost of equal status in blood pressure (systolic).

INTRODUCTION:

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.For batsmen, and bowlers,the primary energy system utilized during competition is the anaerobic lactic processes. In the acts of bowling, and batting, the intervals of activity requiring energy generation to power the athlete's muscles will almost certainly be fewer than 40 seconds. As all players in cricket are at some stage of a match called on to bat and field, much basic fitness training will be common to all players.The Cricket is among the top in this sports. Therefore, there is need to analyse all these factors which can helps in developing the better cricket players and we have to change the old concept and have used to the now concept if we have to attain high level of performance. Thus study will render remarkable contribution to the field by searching out physiological potentialities of cricket players in different level of competitions. Furthermore, it will be matter of curiosity to dig out the physiological variables of cricket players. Today all over the world physical educators and coaches are facing their greatest challenge in handling problems are in scientific way that is to give their sports persons proper and progressive guidelines based on scientific approach which leads to desired results. Sciences physical, physiological and psychological have been recognized as one of the best means of under lying sportsman's performance and of helping in producing better performance. The successful sports persons however, not only possess the apparently ideal physique but also certain physical, physiological and psychological traits developed by the specific events, he is competing in different motor abilities, play decisive role in various sports discipline.

THE PHYSIOLOGY BOWLING:

Imagine standing at the top of your run waiting to bowl the first ball of the first over. As you start your run the muscles in your body respond to the commands of your brain and begin to contract.As you jump into your action you store up power in your muscles. They stretch and contract in exactly the right sequence for you to propel the ball to the other end at pace. You follow though, applying the brakes as you watch the batsman's response.Then you walk back to your mark to do it all again the next ball.What is happening during all this is your body is drawing on energy from various stores. Just like the batsmen, the amount of activity per ball demands a high power output over a short period. Something that puts a strain on the same systems: Mainly the ATP-CP system is activated.As your spell gets longer, despite a few minutes rest between overs, you begin to tire.Yet your reserves of glycogen (the natural fuel of your body) are still not depleted. It's that feeling you get when you are putting everything into it, yet your body is not allowing you to bowl at pace any longer. It also explains why some bowlers are able to get a second wind when they take a wicket. It just can't be accessed unless your subconscious

lets you in.According to some research, this effect is more pronounced in the type of muscle contractions bowlers do with every delivery know as eccentric.The better your muscles are at these eccentric contractions, the longer it will take before you start to get fatigued and lose pace.

As a generalization, it has been found that batsmen tend to be smaller and lighter than bowlers but that they have similar morphological profiles with both batsmen and bowlers averaging approximately 12-14% body fat. Batsmen also have higher predicted maximal oxygen uptake values and faster running with quicker turn times than bowlers but have similar strength and 35 m sprint performances.

PHYSIOLOGICAL ASPECTS:

The present study is considered with various physiological variables, so as to compile the physiological characteristics of cricket players, the following physiological variables were taken into consideration: Blood Pressure (Diastolic and systolic), Pulse Rate, Breath Holding and Respiratory Rate. The physiological aspect of human being is to increase the ability of body to intake the oxygen in sufficient quantities to the muscle cell. It can do in several way by increasing the rate of breathing, by increasing the depth of breathing, by increasing of rate at which oxygen is taken from the air in the lungs into the blood also increasing the amount of haemoglobin available for oxygen transport and increasing the rate of blood flow with increasing the rate at which oxygen is unloaded from the blood at the muscle cell. It is always great task for coaches to specify the characteristics of cricketer for learning of fundamentals of Cricket game. The primary purpose of present study is to conduct a comparative analysis on physiological variables of fast bowlers and batsman in cricket. Objective of the study is to analyse the physiological variables of Spin bowlers and fast bowlers in cricket.

METHODOLOGY:

The present study was a comparative analysis on physiological variables of fast bowlers and batsman in cricket. As per objectives of the study, the investigator has selected 30 Cricket players of 15 bowlers and 15 batsmen on the stratified random sampling basis. Those players were selected on the basis of their participation in Cricket at least in inter-college, state, and universities and at national level in the year 2010-2011, 2011-2012, 2012-2013 from the different University affiliated to AMET University, Chennai, Madras University, Chennai, Anna University, Chennai, Hindustan University, Chennai. Keeping in view the educational importance and performance in sports, the physiological variables as blood pressure (diastolic and systolic), pulse rate and respiratory rate were taken.

TOOLS AND TECHNIQUES :

Following tools were used to measure the physiological variables Blood pressure (both) with stethoscope, sphygmomanometer. Pulse rate with digital pulse rate monitor and Respiratory rate

STATISTICAL PROCEDURE :

A descriptive measure was given for all the variables related to different levels of participants of bowlers and batsmen in cricket separately. Significant of the mean difference between all the groups on all physiological variables were obtained byT-test to find out significant difference and were made according to the requirement of the present study as for statistical technique, simple technique like mean and S.D. were used to find not the nature of difference in the variables as manifested in the response of different groups of crickets players. The investigator proceeded to fulfill the different objectives of the study by analyzing the data with the help of simple techniques like Mean and SD and the significance of difference in the mean scores of all the variables such as physiological measurements were determined between the Fast bowlers and batsmen in cricket and on the total samples retaining the t-test of significance., First of all the investigator has combined all the Fast bowlers and batsmen in cricket-in the two groups i.e. inter-college and inter university respectively. This was done according to the equivalent status of players as inter-college and intervarsity were put in the same status and categories. Then tabulated the raw data and discussion was made of pertaining to physiological variables between the Fast bowlers and batsmen in cricket which were formed out of two level of participation have been discussed. Here in this section comparison was made between all the two groups of Fast bowlers and batsmen in cricket. The results of physiological measurements of two groups formed on the basis of their equal participation level and Out of two categories the investigator made two grounds and analyzed the raw data. The interpretation of data has been given in the following sections.

Table 1:
Comparative Minimum Scores of Fastbowlers and batsmen in Cricket (Inter-university and Inter-college) Physiological variables

Table 1 represented the minimum scores output of the physiological variables of two groups i.e. group-I Inter university cricket players and group-II Inter college cricket players. It was found that group-I players i.e. Inter-university and Inter college level players were better in pulse rate and breath holding rates but they were having more blood pressure (systolic and diastolic) as compared to group-II.

S. No.	Variables	Minimum scores of inter-university cricket players (Group-I)	Minimum scores of inter college cricket players (Group-II)
1	Blood pressure systolic	115 mm/hg	110 mm/hg
2	Blood pressure (diastolic)	68 mm/hg	62 mm/ hg
3	Pulse rate	63 / min.	66 / min.
4	Respiratory rate	16/ min.	18 / min.

Table 2
Comparative Scores for Range of Difference of Group I and Group-II (Inter University and Inter College) cricket players for physiological variables.

Table 2 depicts the comparative scores for range of difference of cricket players clubbed in two groups i.e. group-I Inter College and Inter University for physiological variables.

S.No	Variables	Range of Difference for Group-I Inter University cricket players	Range of Difference for Group-II Inter-college cricket players
1	Blood pressure systolic	15	20
2	Blood pressure (diastolic)	17	21
3	Pulse rate	11	12
4	Respiratory rate	9	7

Table 3
Comparative Mean Scores of Group-I and Group-IIcricket players for Physiological Variables.

S. No.	Variables	Means Scores of Group-I	Mean Scores of Group-II
1	Blood pressure systolic	122.25	121.25
2	Blood pressure (diastolic)	76.91	74.08
3	Pulse rate	69.73	71.38
4	Respiratory rate	21.06	21.91

Table 4:
Comparative Standard Deviation Scores of Cricket Players (Group-I and Group-II) for Physiological Variables.

S. No	Variable	SD of Group-I Inter-universitycricket player	SD of Group-IIIInter-college Cricket players
1	Blood pressure systolic	3.51	3.79
2	Blood pressure (diastolic)	3.37	4.07
3	Pulse rate	3.07	2.52
4	Respiratory rate	2.30	2.28

Table 5:
Significance of Mean Difference of Cricket Players of Group-I and Group-II in Blood Pressure (Systolic Physiological variables)
*Significant at .05 level of confidence.

Mean Value of Group – I (M1)	Mean Value of Group-II (M2)	Mean Difference M1-M2	SE	t-ratio
122.25	121.25	1.00	.52	1.92

The table 5 depicts the mean difference of two groups of Cricket players in blood pressure systolic and found the difference insignificant. The mean value difference between the two groups was 1.00. The standard error denoted as SE =.52. The value of t-test was found 1.92, which is insignificant to the tabulated value't' 5 (.99 = 1.99). The difference between the two groups was very less, which indicates that they were almost of equal status in blood pressure (systolic).

Table 6:
Significance Mean difference of Two Groups of Cricket Players in Blood Pressure (Diastolic)
*Significant at .05 level of confidence.

Mean Value of Group - I	Mean Value of Group-II	Mean Difference	SE	t-ratio
76.91	74.08	2.83	.53	5.34*

Table 7:
Significance Mean Difference of Two Groups of Cricket Players in Pulse Rate
Tabulated value 't' 0.05 (99) =1.99

Table 7 shows that the significance of Mean difference of two groups of cricket players in the physiological variables i.e. pulse rate. The mean difference stands at 1.65 and SE is .40. The t- ratio was calculated as 4.12 which is found significant at .05 level of confidence against the tabulated value of't' .05 (99) = 1.99.

Mean Value of Group-I	Mean Value of Group-II	Mean Difference	SE	t-ratio
69.73	71.38	1.65	40	4.12**

Table 8:
Significance Mean Difference of Two Groups of cricket Players in Respiratory rate

Mean Value of Group-I	Mean Value of Group-II	Mean Difference	SE	t-ratio
21.06	21.91	0.85	.32	2.66**

Table 8 Indicates that there is a significant difference between the two groups of respiratory rate.

Table 9:
Comparative Value ofT- test of cricket players for Physiological Variables
Significant at .05 level of confidence and on 99 degree of freedom in table .05 (99) = 1.99
Table 9 represents the comparative't' test value of physiological variables which were selected for the present study. The 't' test value of blood pressure by systolic was insignificant which means they were almost of equal status in blood pressure (systolic) but for other variables 't' values were found significant, which means the significant difference in between two groups of cricket players was observed in relation to physiological variables.

S.No	Variables	'T' Test Score
1	Blood pressure (systolic)	1.92 NS
2	Blood pressure (diastolic)	5.34*
3	Pulse rate	4.12*
4	Respiratory rate	2.66*

RESULTS:

As per results given in Table 1 to 9 of the physiological variables, the players of Group-I (Inter-University level) were found better in blood pressure diastolic, pulse rate and respiratory rate from the players of Group-II (Inter-college level cricket players) . This significant difference was found at .05 levels of confidence and on 99

degree of freedom and also on .01 levels. The inter college and inter university level cricket players have better mean value in all the physiological variable such as blood pressure (diastolic), pulse rate and respiratory rate. The statistically insignificant difference was found in the blood pressure systolic between the two groups of cricket players.

The result of this study is also comparable with the studies of Frucht and Joki (1964), Buskirk and Jait (1985) and Lloyed (1987). These studies also have the similar type of result. The results of these study has given us the most elaborate mathematically analyses of physiological variables. The adaptation of the body to the stress of muscular effort is expressed numerically in the amount of oxygen supplied to the tissues and constant surveillance of the heart rate and arterial blood pressure permit a safe and reliable evaluation of the subject's aerobic capacity. Balke and Ware (1969), Clarke (1970), Leighton 91981), Nrglie et al (1985) made the scientific evaluation which determined a player's performance capabilities.

CONCLUSION :

The findings reveal that significant difference was found statistically for the both groups. The Group-I i.e. inter university players shown better mean value in physiological variables like blood pressure both pulse rate and respiratory rate in comparison to Group-II cricket players . These differences may be attributed in the fact that Group I (Inter University) cricket players have better conditioned body than to their counterpart players of Group 2(Inter college level). Due to their more participation more conditioning more practice. Their body becomes more conditioned and able to bear and have more stress and hard work due to their better playing environment and participation in game. The upper limits of physiological power i.e. heart rate the coaches and trainers can monitor physiological variables of the players, which help them to have better intensity work load and limits of the energy expenditure to maintain the players to attain their goal for their task. Further, suggested that the comparison can also be made between the non-players and players of other game in physiological parameters

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