

COMPARATIVE STUDY OF PHYSIOLOGICAL VARIABLES OF FEMALE CRICKET PLAYERS AT DIFFERENT LEVELS OF PARTICIPATION

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ABSTRACT

The purpose of the present study was to compare the physiological variables of female cricket players at different levels of participation. The study was administered on 260 women Cricket players in the age group 17-28 years of different levels belonging to Haryana, Punjab and Chandigarh state on the stratified random sampling basis. Physiological variables as blood pressure (diastolic and systolic), pulse rate, breath holding, and respiratory rate were measured. The statistical techniques used to obtain the data were mean, standard deviation, t-test and ANOVA. The findings shows that players of Group-I (Inter-university 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.

Key words: Physiological, Blood Pressure, Pulse Rate, Breath Holding, Respiratory Rate, Cricket Players.

INTRODUCTION:

Modern sports are based on physical, technical, tactical and psychological preparations. In Modern era of competition no one can afford to neglect any aspect of game and sports such as mastery of skills, techniques involved, physical fitness components and psychological abilities. All these aspects are to be developed on the scientific lines. Now a day the teams do not participate just for the sake of participation but to win the competition. There are many magnificent sports which provide enjoyment and recreation for mankind. Some sports have become international in character; others have remained established to one country or state. But undisputedly, Cricket stands high up amongst the sports loving countries of the world for its qualities as a means of entertainment of character building, and even a way of life. (S. Mustaq Ali, 1981). Now-a-days Cricket in India is not merely a sport but, is a culture in India. The game involving 22 players has the capacity to make lakh go destructive for it. Indians are obsessed with this game. That's why during Cricket matches India's social schedule, marketing events, traveling plans and even movie release are made keeping in mind these matches. It will not be an exaggeration to say that Indians are cricketaholic. In modern era, much importance has been

given to the development of sports in India: The Cricket is among the top in this sports. Therefore, there is need to analyze 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 women cricket players in different level of competitions. Furthermore, it will be matter of curiosity to dig out the physiological variables of women cricket players.

In the modern scientific age in every field of human venture, systematic objective and scientific procedures are followed in accordance with principles based upon experience, understanding and application of knowledge of science. The field of games & sports is no exception to this as sports have developed into distinct scientific discipline in itself and every nation is trying to produce top class sports persons to win Laurels in international competitions. 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 actually ideal physique but also certain physical, physiological and psychological traits developed by the specific events, he is competing in different motor abilities, play crucial role in various sports discipline. A performer who wants to excel in sports disciplines, like cricket, has no doubt to pay full attention to the technical aspect but in addition he has to pay much emphasis on developing the desired Physical, physiological and psychological abilities. The performance in competitive sports is mainly influenced by physical, physiological and psychological abilities of a cricket player. Physical abilities are the abilities of the human body to produce force by muscular contraction to resist against fatigue to perform the movement with a wider amplitude and full control and to perform the movement in shortest possible time. The various sports disciplines make different demand on physical abilities. In same sports strength is decisive, the example in weight lifting. In others endurance plays an important role such as in long distance running, cycling, swimming and cricket. In some other speed may play significant role such as in 100mtr and 200mtr sprints or 100mtr swimming. Though cricket is a technical sports discipline in which performance is evaluated on the basis of good batting, bowling & excellent fielding. Yet the learning, performing and playing cricket movement and skills of different departments of cricket to a large extent is also dependent upon the level of physical, physiological and psychological abilities.

PHYSIOLOGICAL ASPECTS

The present study is considered with various physiological variables, so as to compile the physiological characteristics of women 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 hemoglobin 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.

Singh (2002) has studied the kin anthropometric measurements, aerobic and anaerobic fitness among the badminton players. He has study 88 badminton players from the northern region of India with the random sampling device and formed three groups' i.e. national and inter-varsity, state and inter-varsity, district and intercollegiate level players. He has taken 18 kin anthropometric variables and applied 12 minutes run and walk test. He observes that there exists significant difference between aerobic and anaerobic fitness among the three groups of badminton players.

Gulshan Lal Khanna and Indranil Manna (July, 2006) studied the morphological, physiological and biochemical characteristics of Indian National boxers as well as to assess the cardiovascular adaptation to graded exercise and actual boxing round. Two different studies were conducted. In the first study [N = 60, (junior boxers below-19 yrs, n = 30), (senior boxers-20-25 yrs, n = 30)] different morphological, physiological and biochemical parameters were measured. In the second study (N = 21, Light Weight category- <54 kg, n = 7; Medium weight category <64 kg, n = 7 and Medium heavy weight category <75 kg, n = 7) cardiovascular responses were studied during graded exercise protocol and actual boxing bouts. Results showed a significantly higher ($p < 0.05$) significantly higher ($p < 0.05$) maximal heart rates and recovery heart rates were observed in the seniors as compared to the juniors. Significantly higher maximum heart rates were noted during actual boxing compared to graded exercise. Blood lactate concentration was found to increase with the increase of workload during both graded exercise and actual boxing round. The senior boxers showed a significantly elevated ($p < 0.05$) levels of hemoglobin, blood urea, uric acid and peak lactate as compared to junior boxers. In the senior boxers significantly lower levels of total cholesterol, triglyceride and LDLC were observed as compared to junior boxers. No significant change has been noted in HDLC between the groups.

Buget (1982) compared physiological parameters involved in oxygen transportation in men and women. The statistical analysis indicates that cardiac output increased with fitness level and was greater in men.

SAMPLE:

In the present study the investigator used a systematic and random sampling to collect data on 260 women cricket players who represented cricket games at the different level i.e. inter college, state, intervarsity and national level belonging to Haryana, Chandigarh and Punjab. These subjects belonged to the affiliated college of Kurukshetra University, M.D University Rohtak and Punjab University Chandigarh.

OBJECTIVE:

To ascertain whether there is any significant difference in physiological variables i.e. blood pressure (diastolic and systolic), pulse rate, breath holding and respiratory rate among the women Cricket players at different levels of participation.

HYPOTHESIS:

Women Cricket players of different levels were differ significantly on physiological measurements.

METHOD AND PROCEDURE:

The present study was a comparison of women Cricket players of different levels on physiological variables. As per objectives of the study, the investigator has selected 260 women Cricket players of different levels, belonging to Haryana, Punjab and Chandigarh state on the stratified random sampling basis. Those players were selected on the basis of their participation in Cricket at least in inter-college, state, universities and at national level in the year 2008-2009, 2009-2010, 2010-2011 from the different colleges affiliated to M.D. University Rohtak, Kurukshetra University, Ch. Devlal University Sirsa, Punjab University Chandigarh. Keeping in view the educational importance and performance in sports, the physiological variables as blood pressure (diastolic and systolic), pulse rate, breath holding, and respiratory rate were taken. All these women cricket players who have participated at Inter College, State, intervarsity and National in the year 2009-2010, 2010-2011 were selected.

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. Respiratory rate and breath holding with Swiss standard stop watch.

STATISTICAL PROCEDURE:

A descriptive measure was given for all the variables related to different levels of participants of women cricket players separately. Significant of the mean difference between all the groups on all physiological, variables were obtained by employing t-test and Anova (analysis of variance) 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 four groups of Women cricket players and on the total samples employing the t-test of significance., First of all the investigator has combined all the women cricket-players in the two groups i.e. state and inter-college, intervarsity and national respectively. This was done according to the equivalent status of players as state and inter-college, intervarsity and national were put in the same status and categories. Then tabulated the raw data and discussion was made systematized in the four sections. In the first section results pertaining to physiological variables between the two groups of cricket players which were formed out of four level of participation have been discussed. In the second and third section, results related to psychological variables such as personality trusts, adjustments and to sub variables were taken and discussed. Here in this section comparison was made between all the four groups of women cricket players. In the fourth section, results of Anthropometry measurements of two groups formed on the basis of their equal participation level and Out of four categories the investigator made two grounds and analyzed the raw data. The interpretation of data has been given in the following sections:

RESULTS:

The minimum and maximum scores obtained and also the range of scores were calculated and presented in Table 1 to 11. The value of calculated t-test was compared with the tabulated significant value at .05 level of confidence with 99 degree of freedom. The details for comparative mean value and SD values of two groups were tabulated and presented below:

Table 1

**COMPARATIVE MINIMUM SCORES OF WOMEN CRICKET
PLAYERS (INTER-COLLEGE, STATE, INTER-VARSITY AND
NATIONAL) PHYSIOLOGICAL VARIABLES**

S. No.	Variables	Minimum scores of inter- varsity/ national women players (Group-I)	Minimum scores of inter- collage/ state level 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.
5.	Breath holding	27.36 sec.	27.22 sec.

Table 1 represented the minimum scores output of the physiological variables of two groups i.e. group-I intervarsity/ national women cricket players and group-II inter/college/ state level women cricket players. It was found that group-I players i.e. national and inter-varsity 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.

Table 2

**COMPARATIVE MAXIMUM SCORES OF TWO GROUPS OF WOMEN CRICKET
PLAYERS (PHYSIOLOGICAL VARIABLES)**

S. No.	Variables	Group-I /intervarsity players	national women	Group -II State /Inter-college
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1.	Blood pressure (systolic)	130 mm/hg.	130 mm/hg.
2.	Blood pressure (diastolic)	85 mm/ hg.	83 mm/ hg.
3.	Pulse rate	74 / min.	78/ min.
4.	Respiratory rate	25/ min.	25 /min.
5.	Breath holding	106.45 /sec	85.87/ sec

Table 2 depicts the maximum score output of the physiological variables of two groups of women cricket players of Haryana, Punjab and Chandigarh. The data revealed that there is no significant difference in the Mean score of blood pressure systolic, diastolic and respiratory rate except in the mean score of pulse rate and breath holding, among the two groups of women cricket players who participated in cricket game district, inter-college, state, intervarsity and national level from the different colleges of Haryana, Punjab and Chandigarh.

Table 3

**COMPARATIVE SCORES FOR RANGE OF DIFFERENCE OF GROUP I AND
GROUP-II (INTER-VARSITY/ NATIONAL/ INTER-COLLEGE/STATE) WOMEN
CRICKET PLAYERS FOR PHYSIOLOGICAL VARIABLES**

S. No.	Variables	Range of Difference for Group-I national/ intervarsity players	Range of Difference for Group-II State/ Inter-college
1.	Blood pressure (systolic)	15	20
2.	Blood pressure (diastolic)	17	21
3.	Pulse rate	11	12

4.	Respiratory rate	9	7
5.	Breath holding	70.09	68.05

Table 3 depicts the comparative scores for range of difference of women players clubbed in two groups i.e. group-I intervarsity/ national and group-II state/ inter-college for physiological variables.

Table 4

**COMPARATIVE MEAN SCORES OF GROUP-1 AND GROUP-II WOMEN 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
5.	Breath holding	65.11	55.92

Table 5

**COMPARATIVE STANDARD DEVIATION SCORES OF WOMEN CRICKET
PLAYERS (GROUP-I AND GROUP-II) FOR
PHYSIOLOGICAL VARIABLES**

S. No.	Variables	SD of Group-I national/ intervarsity	SD of Group-II State / Inter-college
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
5.	Breath holding	16.85	16.19

Table 5 shows the comparative Standard Deviation (S.D.) scores of women cricket players for physiological variables. The SD scores of physiological variables of Group-I and Group-II women cricket players in the blood pressure (systolic), blood pressure (diastolic), pulse rate, respiratory rate and breath holding were 3.51, 3.37, 3.07, 2.30 and 16.85 respectively of group-I and 3.79, 4.07, 2.52, 2.28 and 16.19 respectively of group-II.

Table 6

**SIGNIFICANCE OF MEAN DIFFERENCE OF WOMEN CRICKET
PLAYERS OF GROUP-I AND GROUP-II IN BLOOD PRESSURE
(SYSTOLIC PHYSIOLOGICAL VARIABLES)**

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

***Significant at .05 level of confidence.**

The table 6 depicts the mean difference of two groups of women 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 7

**SIGNIFICANCE MEAN DIFFERENCE OF TWO GROUPS OF
CRICKET PLAYERS IN BLOOD PRESSURE (DIASTOLIC)**

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

***Significant at .05 level of confidence.**

The table 7 indicates that there is significant difference in mean value of two groups in blood pressure (diastolic).

Table 8

Significance Mean Difference of Two Groups of Women Cricket Players in Pulse Rate

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

Tabulated value 't' 0.05 (99) = 1.99

Table 8 shows that the significance of Mean difference of two groups of women 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.

Table 9

**SIGNIFICANCE MEAN DIFFERENCE OF TWO GROUPS OF
WOMEN 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 9 Indicates that there is a significant difference between the two groups of respiratory rate.

Table 10

**SIGNIFICANCE MEAN DIFFERENCE OF TWO GROUPS OF
WOMEN CRICKET PLAYERS IN BREATH HOLDING**

Mean Value of Group-I	Mean Value of Group-II	Mean Difference	SE	t-ratio
65.11	55.92	9.19	2.34	3.93

Significant at .05 level confidence and on 88 degree of freedom in 't' = .05 (99) = 1.99

Table 10 Indicates that there exists significant difference among the two groups of women players in breath holding test.

Table 11

**COMPARATIVE VALUE OF 'T' TEST OF WOMEN PLAYERS
FOR 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*
5.	Breath holding	3.99*

Significant at .05 level of confidence and on 99 degree of freedom in $t' .05 (99) = 1.99$

Table 11 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 women cricket players was observed in relation to physiological variables.

DISCUSSION:

As per results given in Table 1 to 11 of the physiological variables, the players of Group-I (inter-varsity and national level players) were found better in blood pressure diastolic, pulse rate, respiratory rate and breath holding from the players of Group-II (State and inter-college level) women cricket players . This significant difference was found at .05 levels of confidence and on 99 degree of freedom and also on .01 levels. The national and inter-varsity level women cricket players have better mean value in all the physiological variable such as blood pressure (diastolic), pulse rate, respiratory rate and breath holding. The statistically insignificant difference was found in the blood pressure systolic between the two groups of women cricket players.

Their body has become more adaptive to 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. 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 mathematical 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 (1981), Nrglie et al (1985) made the scientific evaluation which determined a player's performance capabilities. They say 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:

The findings reveal that significant difference was found statistically for the both groups. The Group-I i.e. inter varsity and national level players shown better mean value in physiological variables like blood pressure both pulse rate, respiratory rate and breath holding in comparison to Group-II women cricket players i.e. state and inter college level. These differences may be attributed in the fact that group 1 (national and inter varsity level) women cricket players have better conditioned body than to their counterpart players of Group 2 (state and 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, breath holding 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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