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MEASURING AEROBIC CAPACITY OF CRICKET PLAYERS OFF AND ON THE HIGH ALTITUDE ASTRAND-RYHMING SUB MAXIMAL AEROBIC TEST

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ABSTRACT

The purpose of the study was to find out the aerobic capacity of cricket players. Researcher selected geographically two region of India to measure Aerobic capacity of same cricket players "on" high altitude (Kashmir, J&K), & "off" high altitude (Aligarh, U.P.). For the purpose of study, 30 subjects were selected. For measuring aerobic capacity researcher used Astrand-Ryhming Sub-maximal Aerobic Test. The test was conducted on the same Cricket Players in Kashmir & in Aligarh Muslim University Campus and recorded the efficiency of aerobic capacity of subjects. The descriptive statistical mean was calculated to measure the aerobic capacity efficiency of cricket players. The result of the study revealed that there was a significant difference of cricket player's aerobic capacity efficiency.
Keywords: *Aerobic capacity efficiency, aerobic training, physical fitness, Astrand-Ryhming Sub maximal.*

1. INTRODUCTION

Aerobic capacity is the maximum amount of oxygen that the body can utilize during an exercise session, usually measured during a brief period of high-intensity exercise. It is possible for a person to improve his or her aerobic capacity. For athletes, their aerobic capacity also known as Vo_2 max, short for volume of oxygen maximum is an important aspect of their physical fitness (Sheokand, 2007). Vital capacity is the maximum amount of air a person can expel from the lungs after a maximum inhalation. It is equal to the sum of inspiratory reserve volume, tidal volume, and expiratory reserve volume (Miller-Keane & O'Toole, 2003). Aerobic capacity is not the same as lung capacity, which is simply the volume of air that a person's lung can hold.

Aerobic capacity is perhaps the most important area of any fitness programme. Research clearly indicates that acceptable levels of aerobic capacity are associated with a reduced risk of high blood pressure coronary heart disease, obesity, diabetes, some forms of cancer, and other health problems in adults (Mohammad, & Tareq, 2016). The evidence record the health benefits of physical activity has been summarized most concisely in physical activity and health (Mohammad, 2017).

The American college of sports medicine (ACSM) defines aerobic exercise on "any activity that uses large muscle groups, can be maintained continuously, and is rhythmic in nature". Theoretically, the more oxygen you can use during high level exercise, the more ATP (energy) you can produce. Sports training is a pedagogical process, based on scientific principles, aiming at preparing sportsmen for higher performances in sports competitions. There is less oxygen at higher altitude, an athlete will generally have 5 percent decrease in Vo_2 max results with a 5,000 feet gain in altitude. Living at an altitude for a month enhances subsequent endurance performance, probably by increasing the oxygen-carrying capacity of the blood through an increase in production of red blood cells (Coote, 1995). Aerobic exercise helps in reducing the risk of diabetes. Another important aspect is the psychological benefit of aerobic activity as it reduces anxiety and depression (Mohammad, 2016). The United States President's Council on Physical Fitness and Sports defined the term physical fitness as "the ability to carry out daily tasks with stamina and alertness without undue fatigue, with more energy to enjoy leisure time pursuits and to meet unexpected emergencies" (Clarke, 1976).

Despite its long history and global appeal, relatively little is known about the physiological and other requirements of cricket. 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

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and the generally inadequate understanding of the physiological demands of intermittent activity (Noakes, & Durandt, 2001). The purpose of the present study was to determine aerobic capacity of cricket players "off" and "on "the high altitude Astrand-Ryhming Sub Maximal Aerobic Test.

2. METHODS AND MATERIALS

2.1 Sample and Sampling Technique

It was decided to conduct the study of measuring aerobic capacity of cricket players "off" and "on" the high altitude Astrand-Ryhming Sub Maximal Aerobic Test. For this study it was required to design the test. For the purpose of study 30 male subjects were selected from AMU, Aligarh, India.

The test measures two geographical region of India i.e., High and Low altitude. For conducnting the experiment Kashmir was decided as High altitude and for Low altitude A.M.U. campus Aligarh, U.P. was considered. Astrand-Ryhming Sub maximal Aerobic capacity Test was applied for the collection of the data. The test was conducted to Measuring Aerobic Capacity of same cricket players "off" and "on" the high altitude. Subjects were selected through simple random sampling method. The age of the selected subjects were ranged from 21-28 years.

2.2 Apparatus used for Data Collection

For obtaining data stepping benches (40×40 cm high), Metronome, Stopwatch, and Stethoscope were used.

2.3 Test Administrations

Data on above cited variable were obtained with the standard procedure. The cricketers were asked to perform stepping on a 40 cm high bench. Before the commencement of the test a demonstration of the four count 'up-up-down-down' step test to be performed at a rate of 22.5 steps per minute was given to the participants. Further, the subjects were asked to get ready for the exercise. At the signal 'Go' the subjects start stepping up-up-down-down (four counts for step exercise) and the timer switches on the stopwatch. After one minute of exercise the timer announces, 'stop for pulse count.' The position, and announces for the restart of exercise. Thus, the pulse count was taken after each minute of exercise was same; it was considered to have reached a steady stage. In case the steady stage was not reached, the pulse count after the fifth minute was considered for the scoring. This procedure was applied twice for collecting data on high and low altitude.

2.4 Data Analysis

Obtained data was analyzed by using paired sample t-test, before that raw data was tabulated and standardized for statistical analysis. All statistical functions were performed on SPSS v.19 software, and it was decided to level of significance will be taken at 0.05 with 28 degree of freedom.

3. RESULTS

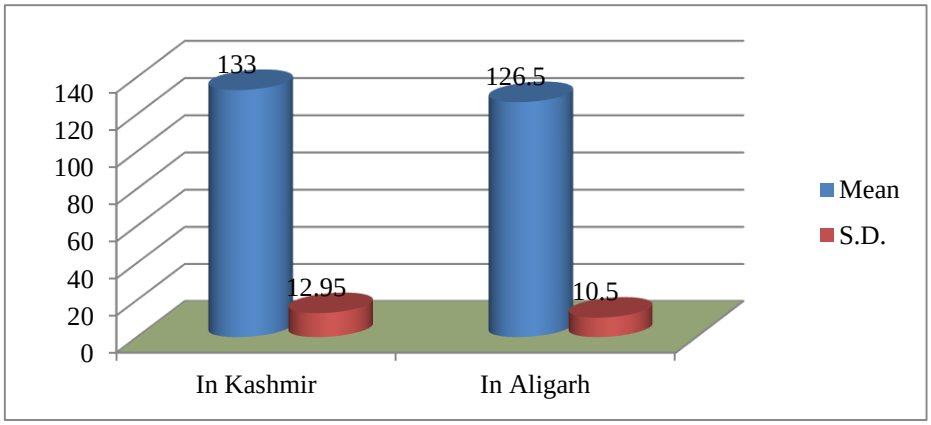
Table 1: Mean, standard deviation, and t-test of Astrand Ryhming sub maximal aerobic test

Variables	Mean	S.D.	Df	t-test
Cricket Players in Kashmir	133	12.95	28	2.12*
Cricket Players in Aligarh	126.5	10.5		

*p<0.05

It can be observed from the Table 1 that the calculated mean and standard deviation "off" and "on" the high altitude Kashmir and Aligarh for same group of Cricketers by using of Astrand-Ryhming sub maximal aerobic test are 133 (12.95) and 126.5 (10.5), respectively. The calculated paired sample *t*-value is 2.12. The table value at 28 degree of freedom is 1.70 with 0.05 levels of significance which means there is significant difference found between "off" and "on" high altitude aerobic capacity of same group of cricketers.

Figure 1: Mean, standard deviation, and *t*-test of Astrand-Ryhming sub maximal aerobic test "off" & "on" in Kashmir and in Aligarh



4. DISCUSSION

It is observed from the finding of the study that the mean 'off and on' high altitude cricket players were found significant different. The result shows that at Kashmir cricket players have high aerobic capacity than Aligarh. It is recognized that physiological fitness is much needed for high level performance such as aerobic and anaerobic capacity, heart rate, and vital capacity. Blood pressure etc. Tremblay, Colley, Saunders, Healy, and Owen, (2010) preaches that fast bowling is predominantly an anaerobic activity which requires an aerobic base. Physiological requirement of player playing at different positions are different. In some games like cricket every skill requires a different physiological status; the batsmen may have different physiological status than a pace bowler or wicketkeeper (Negi, & Pritam, 2012). Living at an altitude for a month enhances subsequent endurance performance, probably by increasing the oxygen-carrying capacity (Coote, 1995). Cricket is one such sport which needs stamina and physical endurance as well. The cardiovascular adaptations, respiratory rate or breathing frequency at a high altitude, effect the aerobic capacity of cricket players The selected cricket players are by birth in (high altitude) Kashmir, this is one of the factor that high altitude players having such a high aerobic capacity than sea level in (Aligarh). Bärtsch and Saltin, (2008) it is clear there is a large endurance component in the game of cricket and particularly fast bowling. Cricket is game which needs physical endurance, thus Altitude training is a popular method athletes utilize, especially aerobic endurance of athletes. The high altitude players to achieve higher vital capacity than low altitude players. Ahsan and Mohammad (2018) argued that residing at high altitude leads to rise in vital capacity. The result of the present study may be different than the earlier findings may be because less number of sample as well as the level of participation in sport.

5. CONCLUSION

On the basis of Astrand Ryhming sub maximal aerobic test, it is concluded that high altitude cricket players were better in Aerobic Capacity, heart rate, vital capacity than low altitude cricket players.

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