Investigation of Aerobic Endurance Anaerobic Capacity of Basketball Players in Tamilnadu

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Abstract

The purpose of the present study was to find out the investigation of aerobic endurance anaerobic capacity of basketball players in Tamil Nadu. To achieve the purpose of the study (N=500) Five hundred men players were selected from various basketball club in Chennai district, during the year 2015. The subject's age ranges from Group-I 16-20 years (n=125), Group-II 21-25 years (n=125), Group-III 26-30 years (n=125) and Group-IV 31-35 years (n=125). The selected players were divided into four equal groups consists of 125 men players each namely age category wise. Aerobic endurance and anaerobic capacity were taken as criterion variables in this study. Statistical technique 'F' ratio was used to analyze the means of the test data of four age category groups. The results revealed that there was a significant difference found on the criterion variables.

Keywords: Aerobic Endurance, Anaerobic Capacity, Basketball Players.

Introduction

The word "aerobic" is meaning with oxygen to represent idea. Even the dynamics of the idea are more complicated than implied by the definition. Aerobic can be viewed as an intricate system of bodily supply and demand. That is the body needs energy for any kind of activity and the need is filled by burning off the foods that eat. Oxygen is the spark the fuel needs to burn regardless aerobics is the word in general use. The fact is that Cooper (1969) codified and organized what fitness means to many people. He is generally credited with being one of the main forces of the current fitness craze. The majority medical opinion is that aerobic programs strengthen heart muscle, increase the efficiency of lungs and offer other wonderful benefits. Aerobic exercise refers to exercise that involves or improves oxygen consumption by the body. Aerobic means "with oxygen", and refers to the use of oxygen in the body's metabolic or energy-generating process (Concise Oxford English Dictionary).

The major benefits of aerobic exercises are stronger and more efficiently operating heart and lungs, more energy, physical flexibility, conditioned muscles, proper use of fats and effective burning of calories. The increased oxygen flow gained through aerobics re-energies by giving any one more energy and a "reawakening" of his senses. (Kolata, Gina 2002). Anaerobic means "without oxygen". During anaerobic work, involving maximum effort, the body is working so hard that the demands for oxygen and fuel exceed the rate of supply and the muscles have to rely on the stored reserves of fuel. In this case waste products accumulate, the chief one being lactic acid. The muscles, being starved of oxygen, take the body into a state known as oxygen debt. The body's stored fuel soon runs out and activity ceases - painfully. This point is often measured as the lactic threshold or anaerobic threshold or onset of blood lactate accumulation (OBLA). Activity cannot be resumed until the lactic acid is removed and the oxygen debt repaid.

Anaerobic power is the power produced without the requirement for oxygen to be present. Sprinting, mainly at the end of a race, is predominately an anaerobic activity. Anaerobic literally means without oxygen. It relates to short-term high-energy production where the predominant fuels are produced without the necessity of oxygen. Tests for anaerobic performance aim to assess relatively short duration exercise bouts. Anaerobic capacity is defined as the maximal amount of adenosine triphosphate resynthesized via anaerobic metabolism (by the whole organism) during a specific mode of short-duration maximal exercise (Green and Dawson, 1993).

Methodology
Selection of the Subjects

The purpose of the study was to analyze the aerobic endurance, anaerobic capacity of Basketball players. To achieve this purpose of the study, five hundred men(N=500) Basketball players who have participated in the district level basketball matches from Tamilnadu, India, during the year 2012-2013, were

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selected as subjects for this study at random. Based on their age the subjects were divided into four equal groups of 125 each (n=125) namely,

- Group-I 16-20 years (n=125)
- Group-II 21-25 years (n=125)
- Group-III 26-30 years (n=125) and
- Group-IV 31-35 years (n=125)

Experimental Design

The study was formulated as a true random group design. The subjects (n=500) were randomly assigned to four equal groups of hundred and twenty five boys were selected as a subject. They were divided into four equal groups namely Group 1 (16-20 years), Group II (21-25 years), Group III (26-30 years) and group IV (31-35 years).

The subjects were tested in order to find out Aerobic endurance, anaerobic capacity.

Selection of Variables

The following criterion variables were selected for the purpose of the study.

- Aerobic Endurance
- Anaerobic Capacity

Criterion Measures

The selected tests were measured by the following units of testing.

1. **Aerobic Endurance:** It was measured by administering Cooper's 12 minutes run/walk test and recorded to nearest in meters.
2. **Anaerobic Capacity:** It was measured by administering Margaria – Kalamen Anaerobic power test and recorded to nearest $1/10^{th}$ of a second.

Statistical Techniques Employed

To achieve the purpose of the study one way Analysis of Variance (ANOVA) was used. If the 'F' ratio found to be significant, the Scheffe's post hoc test was used to find out the significant difference, among the paired means. In all the cases 0.05 level of significance was used to test the hypotheses.

Analysis of the Data

Table I. Computation of analysis of variance on aerobic endurance of basketball players (Scores in Meters)

Mean ± Standard Deviation				Sources of Variance	Sum of Square	df	Mean Squares	Obtained F-ratio	Table "F" Value
Group-I 16-20 years Basketball Players	Group-II 21-25 years Basketball Players	Group-III 26-30 years Basketball Players	Group-IV 31-35 years Basketball Players						
1926.60 ± 266.12	2146.32 ± 70.24	2372.24 ±125.52	2450.72 ± 129.91	Between Within	20760065.6 13439995.2	3 496	6920021.87 27096.75	255.38*	2.62

Significant at 0.05 level of Confidence.
(The table 'F' value required for significance with df 3 and 496 is 2.62).

Table I shows the mean, standard deviation and 'F' ratio of different ages of Basketball players on Aerobic endurance. The mean values of Group-I is 1926.60, Group-II is 2146.32, Group-III is 2372.24 and Group-IV is 2450.72 respectively. The values of standard deviation of Group-I is 266.12, Group-II is 70.24, Group-III is 125.52 and Group-IV is 129.91 respectively. The obtained F-value is 255.38 is greater than the table 'F' value of 2.62 with df 3 and 496

required for significance at 0.05 level of confidence. The results of the study indicate that there is a significant differences among the mean of Group-I, Group-II, Group-III and Group-IV on Aerobic Endurance. As the F-ratio was found significant in case of Aerobic Endurance the Scheffe's post-hoc test was applied to test the significance of differences between paired means separately among Basketball players belonging to different age group which is presented in Table-II.

Table II. Significance differences between the paired means of aerobic endurance performance among basketball players belonging to different age groups

Means				Mean Difference	Confidence Interval
Group-I (16-20 years Basketball Players)	Group-II (21-25 years Basketball Players)	Group-III (26-30 years Basketball Players)	Group-IV (31-35 years Basketball Players)		
1929.60	2146.32	--	--	216.72*	58.30
1929.60	--	2372.24	--	442.64*	58.30
1929.60	--	--	2450.72	521.12*	58.30
--	2146.32	2372.24	--	225.92*	58.30
--	2146.32	--	2450.72	304.40*	58.30
--	--	2372.24	2450.72	78.48*	58.30

* Significant at 0.05 level of confidence

Figure I. Cylinder diagram show the mean values of group-I, group-II, group-III and group-IV on aerobic endurance
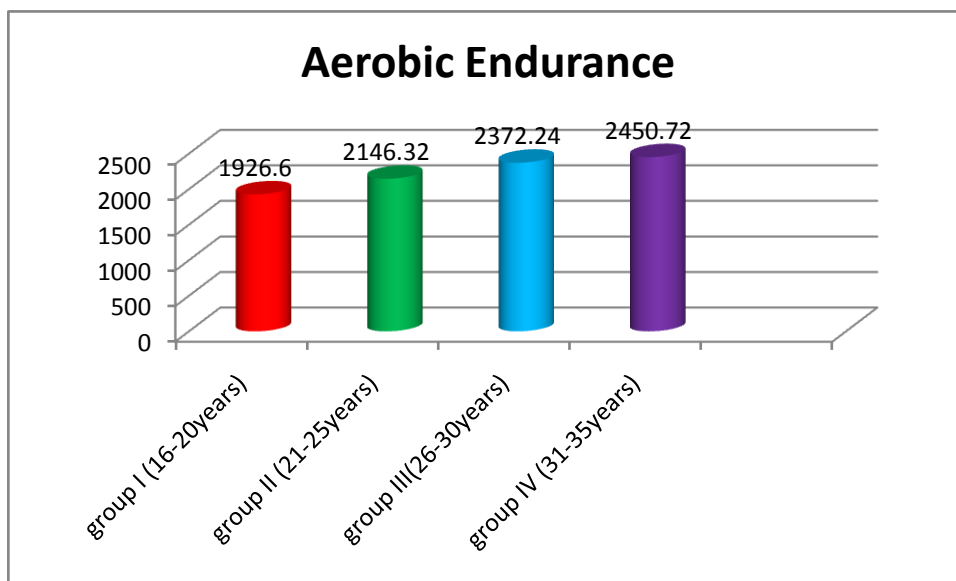
Table III. Computation of analysis of variance on anaerobic capacity of basketball players (Scores in Seconds)

Mean ± Standard Deviation				Sources of Variance	Sum of Square	df	Mean Squares	Obtained F-ratio	Table "F" Value
Group-I 16-20 years Basketball Players	Group-II 21-25 years Basketball Players	Group-III 26 30 years Basketball Players	Group-IV 31-35 years Basketball Players						
87.69 ± 7.43	89.25 ± 7.30	97.87 ± 6.67	110.49 ± 11.36	Between	40945.21	3	13648.40	193.47*	2.62
				Within	34989.91	496	70.54		

*Significant at 0.05 level of Confidence.
*(The table 'F' value required for significance with df 3 and 496 is 2.62).*

Table III shows the mean, standard deviation and 'F' ratio of different ages of Basketball players on Aerobic endurance. The mean values of Group-I is 87.69, Group-II is 89.25, Group-III is 97.87 and Group-IV is 110.49 respectively. The values of standard deviation of Group-I is 7.43, Group-II is 7.30, Group-III is 6.67 and Group-IV is 11.36 respectively. The obtained F-value is 193.47 is greater than the table 'F' value of 2.62 with df 3 and 496 required for significance at 0.05 level of confidence. The results of the study indicate that there is a significant differences among the mean of Group-I, Group-II, Group-III and Group-IV on Anaerobic Capacity.As the F-ratio was found significant in case of Anaerobic Capacity the Scheffe's post-hoc test was applied to test the significance of differences between paired means separately among Basketball players belonging to different age group which is presented in Table-IV.

Table IV. Significance differences between the paired means of anaerobic capacity performance among basketball players belonging to different age groups

Means				Mean Difference	Confidence Interval
Group-I 16-20 years Basketball Players	Group-II 21-25 years Basketball Players	Group-III 26-30 years Basketball Players	Group-IV 31-36 years Basketball Players		
87.69	89.25	--	--	1.56	2.97
87.69	--	97.87	--	10.18*	2.97
87.69	--	--	110.49	22.80*	2.97
--	89.25	97.87	--	8.62*	2.97
--	89.25	--	110.49	21.24*	2.97
--	--	97.87	110.49	12.62*	2.97

* Significant at.05 level of confidence

Figure II. Cylinder diagram show the mean values of group-I, group-II, group-III and group-IV on anaerobic capacity
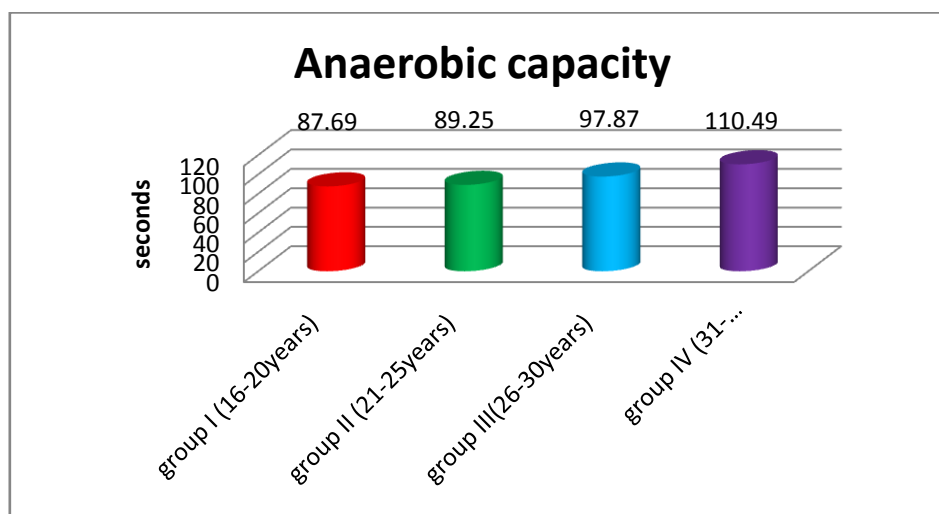
Conclusion

From the results of the study the following conclusions were drawn.

1. There was a significant difference on Aerobic Endurance and Anaerobic capacity among different age groups of Basketball players (16-20 years, 21-25 years, 26-30 years and 31-35 years).

2. The age group 31-35 years basketball players is better in Aerobic Endurance and Anaerobic Capacity than other age groups of 16-20 years, 21-25 years and 26-30 years.

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