

## COMPARATIVE STUDY OF AEROBIC AND ANAEROBIC CAPACITY OF MALE AND FEMALE PLAYERS OF INDIVIDUAL SPORTS

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### Abstract

The purpose of the present investigation was to compare Aerobic Capacity and Anaerobic Capacity of Male and Female Players of Individual Sports (Swimming, Badminton and Athletics). Method: For achieve this purpose, sixty(60) Players (Male=30 and Female=30) student of individual games were selected from Gwalior (Madhya Pradesh). The age of the student ranged from 18 to 25 years. Total two variables Aerobic and Anaerobic were selected. Anaerobic Capacity was measured by the performance of 50 meter dash in second. Aerobic Capacity was measured by the performance of 600 yard run/walk on standard track with the help of stop watch in second/minute. The result of the investigation should highly significant in both variables of Aerobic and Anaerobic Capacity. In relation to aerobic capacity of male players of individual sports no significant difference was found among the players of swimming, badminton and athletics. In case of aerobic capacity of female players of individual sports no significant difference was found among the players of swimming, badminton and athletics. Anaerobic capacity of male players of individual sports significant difference was found among the players of swimming, badminton and athletics. In relation to anaerobic capacity of female players of individual sports no significant difference was found among the players of swimming, badminton and athletics.

**Keywords:**Endurance, Swimming, Athletics and Physiological

### Introduction

Male and Female performance in sports or any other field depends on his movements oriented behavioral those action which can be noted by with or without the aid of instrument and which have their roots in the biological phenomena. In other word, the performance of an individual is the result of the integrated and harmonious functioning of the several dynamic processes of the body which are the either physiological and/or biochemical in nature. Aerobic capacity is defined as the maximum amount of oxygen the body can use during a specified period, usually during intense exercise. Anaerobic capacity is the ability to mobilize energy during activities of intense nature i.e. executing intensive work with explosive action in short duration of time, such as, Badminton faster and for, explosive take-off in jumps, maximum rate for about two to three minutes, under water swimming etc.

Human movement through water is known as Swimming. Swimming is a good exercise. Swimming involves the use of almost all the muscles required for movement It is a great low-impact Aerobic activity to keep one fit and healthy, moreover. It is an activity that can be taken up by anyone irrespective of age and fitness levels. Badminton is sports requiring high level of physical fitness. It is one of those rare games which demands not only speed but Agility, Strength, Power and Endurance. Improving Aerobic Capacity and overall fitness boots performance on the Badminton Court. The most prestigious track and field contests occur within athletics championships and athletics programmes at multi-sport events. Track and field events have become the most prominent part of major athletics championships and many famous athletes within the sport of athletics come from this discipline.

### Objectives of the study

The purpose of this study was to compare the aerobic and anaerobic capacity of male and female players of individual sports.

### Methodology

The subjects for this study were randomly selected from individual sports i.e. swimming, badminton and athletics from Institute of Professional Studies, Gwalior, Madhya Pradesh and Lakshmbai National University of Physical Education, Gwalior, Madhya Pradesh. Selections of the subjects were made following Simple Random technique by drawing lots. A total sixty (60) male and female players selected as subject for this study. The subject age was ranged between 18 to 25 years. Data were collected by applying basic motor ability test and using specific equipment specially designed for measuring the physiological variables in the month of august 2009 to attain the objectives of the present study :-

Tests used for selected variables-

Physical Variables	Testing Measure
Anaerobic Capacity	50 meters sprint
Aerobic Capacity	600 yard run/walk

**Statistical Analysis**

The data were analysis by 'F' ratio to compare the aerobic capacity and anaerobic capacity among different individual sports. In this section data were analysed through descriptive analysis and one way analysis of variance (ANOVA) for male and female separately.

**Finding and Results**

**TABLE NO.1**

DESCRIPTIVE ANALYSIS OF AEROBIC CAPACITY OF MALE PLAYERS

Individual Sports	Mean	S D	Min.	Max.	Range
Swimming	1.74	0.24	1.52	2.05	1.53
Badminton	1.80	0.24	1.53	2.05	1.52
Athletics	1.62	0.21	1.47	2.03	1.56

Table no.1 indicates descriptive analysis of swimming, badminton and athletics (individual sports). Mean, standard deviation, minimum, maximum and range are described in details. For swimmers mean is 1.74, standard deviation is 0.24, minimum is 1.52, maximum is 2.05 and range is 1.53. For badminton players mean is 1.83, standard deviation is 0.24, minimum is 1.53, maximum is 2.05 and range is 1.52. In case of athletes mean is 1.62, standard deviation is 0.21, minimum 1.47, maximum is 2.03 and range is 1.56. Graphical representation of above table is made in figure.

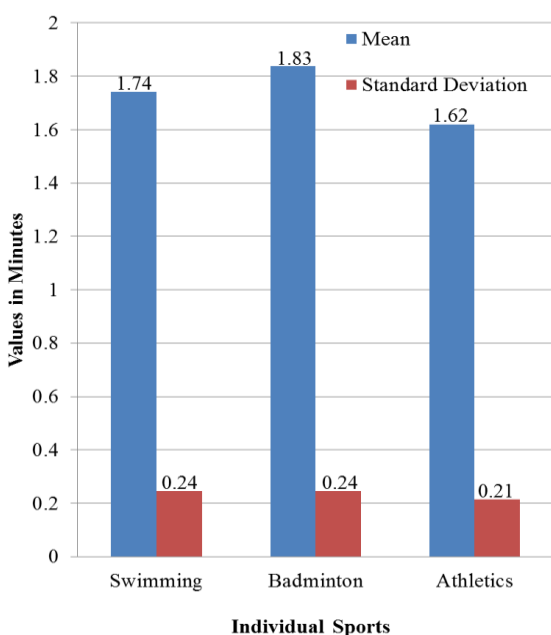


Fig. No. 1: Mean and Standard Deviation Values of Swimming, Badminton and Athletics Players

**TABLE NO.2**

ANALYSIS OF VARIANCE OF AEROBIC CAPACITY OF MALE PLAYERS

Source of Variance	Degree of Freedom	Sum of Squares	Mean Square	'F' Ratio
Between Groups	2	0.23	0.119	2.14
Within Groups	27	1.50	0.056	

\*Significant at 0.05 level tab 'F'  $(0.05)(2, 27) = 3.35$

Table no.2 indicates aerobic capacity comparison among different individual sports i.e., swimming, badminton and athletics which is not significant as calculated 'F' ratio 2.14 is less than the tabulated 'F' ratio 3.35 at 0.05 level of significance

**TABLE NO.3**

DESCRIPTIVE ANALYSIS OF AEROBIC CAPACITY OF FEMALE PLAYERS

Individual Sports	Mean	Standard Deviation	Minimum	Maximum	Range
Swimming	2.80	0.26	2.47	3.10	1.63
Badminton	2.82	0.29	2.51	3.19	1.68
Athletics	2.77	0.32	2.29	3.11	1.82

Table no.3 indicates descriptive analysis of swimming, badminton and athletics (individual sports). Mean, standard deviation, minimum, maximum and range are described in details. For swimmers mean, standard deviation, minimum, maximum and range is 2.80, 0.26, 2.47, 3.10 and 1.63 respectively. For badminton players mean, standard deviation, minimum, maximum and range is 2.82, 0.29, 2.51, 3.19 and 1.68 respectively. In case of athletes mean, standard deviation, minimum, maximum and range is 2.77, 0.32, 2.29, 3.11 and 1.82 respectively. Graphical representation of above table is made in figure.

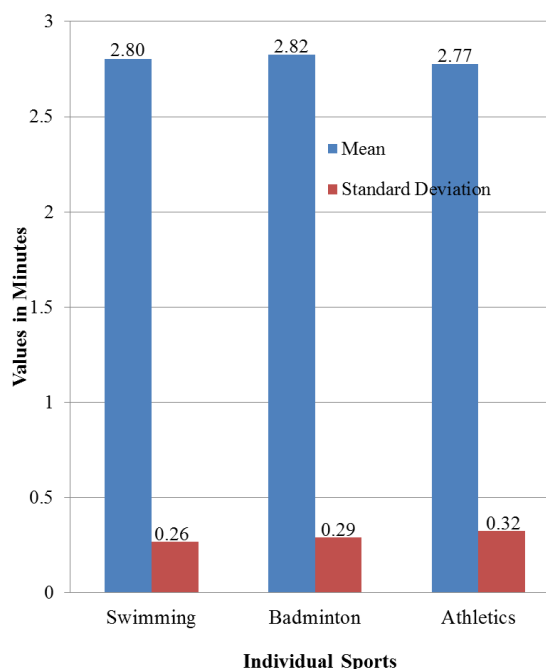


Fig. No. 2: Mean and Standard Deviation Swimming, Badminton and Athletics Player

**TABLE NO.4**  
ANALYSIS OF VARIANCE OF AEROBIC CAPACITY OF FEMALE PLAYERS

Source of Variance	Degree of Freedom	Sum of Squares	Mean Square	'F' Ratio
Between Groups	2	0.012	0.006	0.068
Within Groups	27	2.37	0.008	

\*Significant at 0.05 level tab 'F'  $(0.05)(2, 27) = 3.35$

Table no.4 indicates aerobic capacity comparison among different individual sports i.e., swimming, badminton and athletics which is not significant as calculated 'F' ratio 0.068 is less than the tabulated 'F' ratio 3.35 at 0.05 level of significance.

**TABLE NO.5**  
DESCRIPTIVE ANALYSIS OF ANAEROBIC CAPACITY OF MALE PLAYERS

Individual Sports	Mean	S.D.	Min.	Max.	Range
Swimming	7.69	0.40	7.10	8.10	2.00
Badminton	7.04	0.10	6.89	7.19	1.30
Athletics	6.61	0.78	5.65	7.79	3.14

Table no.5 indicates descriptive analysis of swimming, badminton and athletics (individual sports). Mean, standard deviation, minimum, maximum and range are described in details. For swimmers mean, standard deviation, minimum, maximum and range is 7.69, 0.40, 7.10, 8.10 and 2.00 respectively. For badminton players mean, standard deviation, minimum, maximum and range is 7.04, 0.10, 6.89, 7.19 and 1.30 respectively. In case of athletes mean, standard deviation, minimum, maximum and range is 6.61, 0.78, 5.65, 7.79 and 3.14 respectively. Graphical representation of above table is made in fig. no.3.

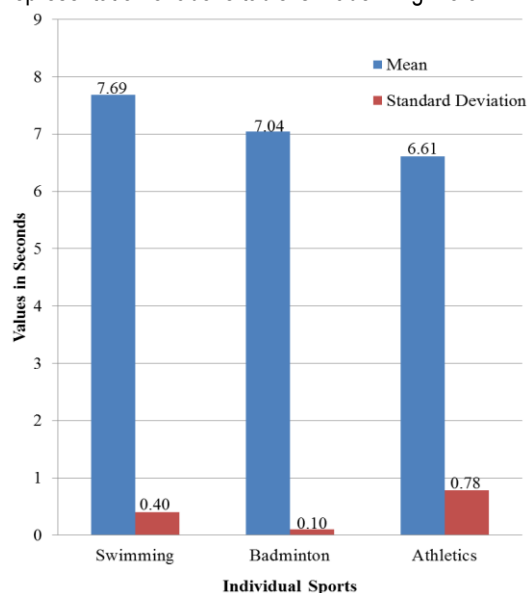


Fig. No. 3: Mean and Standard Deviation Values of Swimming, Badminton and Athletics Players.

**TABLE NO.6**  
ANALYSIS OF VARIANCE OF ANAEROBIC CAPACITY OF MALE PLAYERS

Source of Variance	Degree of Freedom	Sum of Squares	Mean Square	'F'
Between Groups	2	5.87	2.93	11.44*
Within Groups	27	7.11	0.264	

\*Significant at 0.05 level tab 'F'  $(0.05)(2, 27) = 3.35$

Table no.6 indicates anaerobic capacity comparison among different individual sports i.e., swimming, badminton and athletics which is significant as calculated 'F' ratio 11.44 is more than the tabulated 'F' ratio 3.35 at 0.05 level of significance.

**TABLE NO.7**  
POST HOC TEST FOR ANAEROBIC CAPACITY OF MALE PLAYERS

Swimming	Badminton	Athletics	Mean Difference	Critical Difference
7.69	7.04		0.64*	0.47
7.69		6.61	1.07*	0.47
	7.04	6.61	0.43	0.47

\*Critical Difference at 0.05 level of significance.

Table no.7 indicates that there is significant difference between the mean of swimming with badminton and athletics, the difference are 0.64 and 1.07 which is greater than the required critical difference value i.e. 0.47 at 0.05 level of significance.

**TABLE NO.8**  
DESCRIPTIVE STATISTICS OF ANAEROBIC CAPACITY OF FEMALE

Individual Sports	Mean	Standard Deviation	Min.	Max.	Range
Swimming	9.50	0.46	8.85	10.00	2.15
Badminton	9.03	0.50	8.34	10.00	2.66
Athletics	8.98	0.51	8.30	10.01	2.71

Table no.8 indicates descriptive analysis of swimming, badminton and athletics (individual sports). Mean, standard deviation, minimum, maximum and range are described in details. For swimmers mean is 9.50, standard deviation is 0.46, minimum is 8.85, maximum is 10.00 and range is 2.15. For badminton players mean is 9.03, standard deviation is 0.50, minimum is 8.34, maximum is 10.00 and range is 2.66. In case of athletes mean is 8.98, standard deviation is 0.51, minimum 8.30, maximum is 10.01 and range is 2.71. Graphical representation of above table is made in fig. no.4.

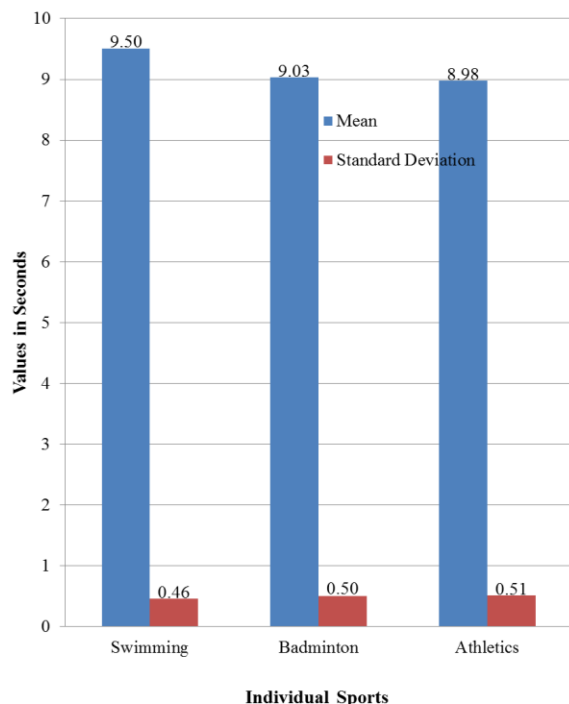


Fig. No. 4: Mean and Standard Deviation Values Swimming, Badminton and Athletics Players.

**TABLE NO. 9**  
ANALYSIS OF VARIANCE OF ANAEROBIC CAPACITY OF FEMALE PLAYERS

Source of Variance	Degree of Freedom	Sum of Squares	Mean Square	'F' Ratio
Between Groups	2	1.64	0.82	3.30
Within Groups	27	6.63	0.24	

\*Significant at 0.05 level tab 'F'  $(0.05)(2, 27) = 3.35$

Table no.9 indicates anaerobic capacity comparison among different individual sports i.e., swimming, badminton and athletics which is not significant as calculated 'F' ratio 3.30 is less than the tabulated 'F' ratio 3.35 at 0.05 level of significance.

**Discussion of Finding**

The statistical findings of the present study revealed that the aerobic capacity of different individual sports is not significantly different. More or less similar kind of aerobic capacity is required in all types of sports. Aerobic capacity play vital role in all types of sports. Each sportsmen have to develop it according to its need and requirement in their respective games and sports.

It was also revealed that the anaerobic capacity of male players of individual sports is significantly different, but anaerobic capacity of female players of individual sports is not significantly different. Same as aerobic capacity this is also

required for each sports i.e. sportsmen do give proper weight age for its development.

**Conclusion**

In relation to aerobic capacity of male and female players of individual sports insignificant difference was found among the players of swimming, badminton and athletics. On the other hand anaerobic capacity of male players of individual sports significant difference was found among the players of swimming, badminton and athletics. In relation to anaerobic capacity of female players of individual sports insignificant difference was found among the players of swimming, badminton and athletics.

**References:**

Bhanot, J.L., Sidhu, L.S. (March, 1983). "Maximal Anaerobic Power in Indian National Hockey Players", British Journal sports medicine, vol. 17, No. 1.

Bhanot, J.L., Sidhu, L.S. (Dec, 1980). "Maximal Anaerobic Power in National Level Indian Players, British Journal Sports Medicine, Vol. 15, No.4.

Caru, et. al. (June 1970). "Maximal Aerobic and Anaerobic muscular Power in Football Players", The Journal of Sports Medicine and Physical Fitness 10: 2.

Caw, B. et. al. (June, 1970). "Maximal Aerobic and Anaerobic Muscular Power in Football Players", The Journal of Sports Medicine and Physical Fitness 10.

Mathews Donald K. and Fox Edward L., "The physiological Basis of Physical education and Athletics Philadelphia : WB Soundlers company, 1976.

Mathews, Donald K. et. al., "Aerobic and Anaerobic Efficiency," : 34 June 1963.

Paperescos, N., (1971) "Prospects of the Activities and Research of Sports medicine for a period of time as for as can be foreseen" Report of Eleventh session of the International Olympic Academy at Olympia Athens: Hellenic Olympic committee.

Prokoyo, Ludaring (1977). "The Contribution of Sports Medicine to the Improvement of Performance" Report of the Seventh session of the International Olympic academy at Olympia Athens: Hellenic Olympic committee.

Taylor, Henry L. and Rowell, Loring B., (1974). "Exercise and Metabolism" Science and Medicine of Exercise and Sport, 2nd ed, Warren R. Johnson and E.R. Buskirk London: Herper and Roul Publishers.

Uppal, A.K., (2001). "Principles of Sports Training," Friends publications Delhi.

Wilgus, William Eugene, ( 1963). "A Comparison of Efficiency between Aerobic and Anaerobic Work," Completed research in Health, Physical education and Recreation 5.

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